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THE AMERICAN
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JANUARY, 1886.

SEVERAL OFFICIAL OINTMENTS.

By R. Rother.

When hog's fat, of the body cavity, is freed from investing membranes by a process of fusion, it is said to be "prepared," and is then officially termed lard. Conventionally, however, the unprepared internal fat is also called lard. But this confusion of terms is of no serious consequence, since the connection in which they appear generally determines the one that is meant. Fat, when properly purified, is not exceedingly prone to objectionable changes. Contamination with parts of the original integument, but particularly the presence of water, either imperfectly removed or fraudulently added, induces speedy and destructive change. In course of time and through changing temperature, good and pure lard will become more or less granular, but still remain suitable for its various applications. The action of water, especially when aided by continued warmth, deteriorates lard in a variety of ways. One of the most undesirable and conspicuous of these results is the so-called rancidity. This is perhaps partially superinduced by a species of fermentation, the degraded product being either coincidently or subsequently still further damaged by oxidation.

Numerous remedies have been suggested and tested in order to obviate these tendencies. As already stated, the absence of water insures a more extended permanence. In many instances, however, its presence is essential for other reasons, and hence the application of some preservative becomes necessary. Officially, benzoin is used for this purpose, which seems to answer very well in the majority of cases. There is, however, a limit to its capacity in both time and conditions. The benzoic acid is here doubtless the active agency, as far as the suppression of fermentation is concerned. On the oxidation it possibly has no effect to the extent that this is independent of the former. A benzoin-protected fat may therefore become disqualified

for medicinal use through pure atmospheric influence. When benzoinated lard is mixed with substances which combine with or destroy the benzoic acid, the resulting ointment, if at all hydrous, is as liable to spoil similar to aqueous lard without benzoin.

Benzoin imparts an unpleasing discoloration to fats. Owing to its disposition to become more hardened by heating, the benzoin is not readily extracted by the melted lard. Furthermore, suspended particles difficult of separation are likely to contaminate the product. The writer has found that the application of balsam of tolu in place of benzoin is attended by superior effects. The cinnamic acid which is the chief active constituent of the balsam is a more powerful antizymotic than benzoic acid. In consequence, the preservation will be more thorough and lasting. By reason of the ready fusibility of the balsam, its contact with the heated lard is correspondingly intimate. The fused fat extracts apparently everything from it of a desirable nature. The inert residue that finally remains is somewhat less fusible than the original balsam. This residuum has the valuable property of gathering up all floating particles contained in the mixture, and in becoming agglutinated permits the complete decantation of the clear and fluid fat. The product, when cooled, has the precise odor of benzoinated lard.

It is known that ordinary resin—usually called rosin—gives durability to ointments containing it. The writer believes that its judicious employment for preserving fats would give desirable results, when added in no larger proportion than one per cent. It is wholly soluble in fats, is scarcely perceptible by its odor, and imparts no color when the light yellow kind is used.

In contradistinction, fats impregnated with tolu might be styled toluinated, and those with resin resinated. The writer, however, is in favor of generally terming fats thus treated "preserved" fats.

Where the consistency of lard is not of the requisite firmness, wax, spermaceti, suet, etc., are added in proper degree.

Yellow wax appears to possess preserving powers. White wax and spermaceti are much less efficient, although retarding deterioration to some extent. The latter two are sometimes already tainted in themselves. In these compounds, the closer texture is doubtless the main cause of their greater permanence. The combinations between spermaceti and lard are characterized by clearness of grain, remarkable smoothness and ready fusibility, but are only moderately firm. The

wax mixtures are much harder, but less smooth and regularly grained, as a result of the great difference in the fusibility of the components. On becoming rancid, or when subjected to variable temperatures, the wax and spermaceti ointments do not disintegrate into a fluid and solid portion peculiar to the transformation of unmixed lard under similar conditions.

It appears that certain fats, under zymotic influence, in the presence of water, assimilate this and generate a new order of fats and free fatty acids. The fatty acids and the corresponding glycerides that are susceptible of these changes belong to the acrylic series, the acids of which are represented by the general formula $C_nH_{2n-2}O_2$. Oleic acid is the most common and best known member of this class. Acrylic acids, on fusion with potash, absorb the oxygen of water, expelling the hydrogen while generating two new acids of the fatty series, the members of which have the general formula $C_nH_{2n}O_2$. Acrylic acids are also directly transformed into fatty acids by the assumption of nascent hydrogen. The first reaction may be expressed by the following equation, in which n of course has a different value for each formula:

$$°(C_nH_{2n-2}O_2)+2OH_2=\backprime(C_nH_{2n}O_2)+\backprime\backprime(C_nH_{2n}O_2)+2H.$$

Since, in the rancidification or fermentative transformation of acrylic acids or their glycerides, no hydrogen is eliminated, the change may occur as shown in the following equation, the n of each formula having a distinct value:

$$2°(C_nH_{2n-2}O_2)+2OH_2=°(C_nH_{2n}O_2)+\backprime(C_nH_{2n}O_2)+\backprime\backprime(C_nH_{2n}O_2).$$

This reaction seemingly explains the peculiar disintegration of fats containing olein. Some of the resulting glycerides or free fatty acids will be more, and a portion less, fusible than the original components, and therefore have a stronger disposition to separate from each other. The free acids near the base of the fatty series—as, for instance, acetic, propionic, butyric, etc.—are strongly odorous and irritant, while the higher members, such as palmitic, stearic, etc., are inodorous, non-irritant and bland.

Stearic acid, known in commerce as hard stearin, is a white, crystalline, odorless and tasteless solid, firmer than spermaceti and more tenacious than wax. Its fusion-point is quite low, being 69°C. It melts readily, and promptly congeals on cooling. During the melting a portion rises in vapor, hence the temperature should not be raised

unnecessarily high. As all the acids of the fatty series, it is quite unalterable under ordinary conditions, and resists the influence of decomposing agents with considerable force. Melted lard and warm oils abundantly dissolve stearic acid, but on cooling it rapidly separates in crystals. The writer has, however, employed it with much success in various connections.

The remarkable hydrocarbons at the upper end of the paraffin series are rapidly attaining a merited popularity. The firmest of these substances, commercially termed paraffin wax, has long been favorably known for numerous uses. The more fusible and unctuous body now officially recognized under the name of petrolatum, is finding even more valuable applications in medicine and pharmacy. The market also affords an oily body of the same class which will doubtless rank popularly very high in due time.

Paraffin wax is colorless and odorless. Petrolatum has heretofore been furnished of a variable yellow shade, and more or less odorous. It can now be obtained perfectly colorless, like paraffin wax, and wholly or quite free from odor. The commercial variety termed vaselin appears to be superior in these respects. The official term petrolatum seems to be appropriate and convenient. The writer would suggest that the so-called paraffin wax be called petrolatum wax, and the oily body petrolatum oil. Of course, these three substances are not single and definite, being merely separated within convenient limits of fusibility. Each one of them is probably a mixture of several definite hydrocarbons, separable, however, by fractional distillation.

It is well known that when carbolic acid is dissolved in ordinary fats or oils, it loses its causticity and more decided irritant qualities, while retaining all its valuable medicinal properties. But when dissolved in petrolatum it retains an undiminished harshness, even in extreme degrees of dilution. The writer found that a small proportion of lard, when added to the mixture, blunted the virulence of the carbolic acid completely. When stearic acid is melted with petrolatum, a more lasting and intimate union results than with ordinary fats. Stearic acid and phenol appear to merge in all proportions. The mixture on cooling resumes a crystalline form, retaining a permanent character. If the cooling mixture is well stirred during congelation a granular or powdered form is obtained which may possibly prove useful for certain purposes. On fusing carbolic acid, stearic acid and

petrolatum together, an excellent carbolic ointment results. A desirable product is obtained by melting one troy ounce of stearic acid with one troy ounce of petrolatum, then gradually adding seven troy ounces more of petrolatum, while maintaining the heat, to insure perfect fusion. To this mixture one troy ounce of carbolic acid is added, either previously fused or in detached crystals, then stirred until thoroughly mixed, and finally permitted to cool during occasional stirring.

The Pharmacopœia has now adopted the superior thiosulphate process for preparing ointment of potassium iodide. But the employment of benzoinated lard is not only unnecessary and useless, but possibly detrimental. Another error was committed in using an insufficient quantity of water for permanently dissolving the salt. Although a barely ample amount of hot water is directed, nevertheless the solution of the salt on cooling deposits more than half of it in crystals. Under the circumstances, it would have been much better to incorporate the saline mixture dry and finely powdered. Properly, however, the salt should be in perfect and permanent solution. The writer has always noticed that when lard alone is used in making this ointment, a speedy and decided disintegration of the fatty excipient results. A small proportion of white wax will always prevent this, and add to the general preservation of the ointment.

It was ascertained that petrolatum wax (paraffin wax) yields a smoother, even whiter, and otherwise stabler product. The writer now prepares this ointment by fusing together three-fourths of a troy ounce of petrolatum wax and three-fourths of a troy ounce of lard, then gradually adding four and a half troy ounces more of lard and setting the melted mixture aside. One troy ounce of potassium iodide and twenty-four grains of sodium hyposulphite (thiosulphate) are then dissolved in one fluid ounce of water. This solution is now thoroughly incorporated with the fatty excipient, previous to its complete congelation. When it is deemed desirable to use petrolatum in preparing this ointment, the white article is preferable. The saline solution is not miscible with petrolatum alone. A small proportion of lard, however, effects a ready mixture. The writer has found stearic acid more adaptable. Too large a proportion of this again prevents a proper union. A slight discoloration of the ointment results from the liberation of a trace of iodine. The presence of a small amount of sodium hyposulphite gives a product of superior

whiteness. The ointment is then best prepared by melting half a troy ounce of stearic acid with half a troy ounce of white petrolatum, and gradually adding five troy ounces more of white petrolatum and setting the fused mixture aside. One troy ounce of potassium iodide and eight grains of sodium hyposulphite are dissolved in one fluid ounce of water. This solution is then thoroughly incorporated with the fatty excipient, either before or after complete congelation has occurred.

Zinc ointment, when prepared with lard alone, how much soever benzoinated, will soon give indications of change. The zinc oxide seems here to aid in decomposing the fat. The writer is in the habit of preparing considerable of this ointment—usually ten pounds at a time. A small proportion of white wax gave very good results, but subsequently a mixture of wax and spermaceti proved to be better. A very fine product is obtained by the use of stearic acid. In this case a zinc stearate seems to form—at least superficially. By this means the ointment has a much finer grain than usual, while the zinc compound remains better suspended in the fused excipient. It is questionable whether a "preserved" fat is essential in preparing zinc ointment, since the benzoic or cinnamic acid is likely to combine with the zinc, and thus, perhaps, lose its efficiency. Some difficulty is encountered in preliminarily giving the zinc oxide a proper degree of fineness for admixture with the fatty medium. For a long time the writer secured the best results by first triturating the oxide with a small proportion of the fat, and then gradually adding the remainder in a melted state. Since then it was, however, ascertained that when the oxide is first rubbed together with a small proportion of powdered starch, the mixture may then be readily passed through a fine sieve and thus brought into an appropriate form.

The following process has thus far yielded the most satisfactory product:

Zinc oxide	4 troy ounces.
Starch, pulverized	½ " "
Spermaceti	½ " "
White wax	1 " "
Lard	14 " "
Balsam tolu	120 grains.

Triturate the oxide of zinc with about three-fourths of the powdered starch and sift the mixture with a No. 80 sieve. Rub the coarse portion remaining on the sieve with the rest of the starch, and pass it

all through the sieve. Melt the wax and spermaceti with half an ounce of the lard, and then gradually add the remaining lard. Now add the balsam to the fused fat and apply heat for 15 to 20 minutes, not exceeding 60°C of temperature, and then decant the fluid portion. Pour this gradually upon the zinc oxide mixture, stirring it well meanwhile, and when all the fused medium has been incorporated, stir the mixture occasionally until the ointment stiffens.

With the use of stearic acid the balsam can be omitted, and the proportions will be: Zinc oxide 4 troy ounces, starch ½ troy ounce, stearic acid 1 troy ounce, and lard 14½ troy ounces. The manipulation is essentially like that of the preceding process.

With white petrolatum a magnificent ointment is produced; but, owing to the relatively greater cost of the fatty medium, the ointment becomes too expensive for general sale.

With the facilities at the disposal of pharmacists, it is impossible to prepare a proper mercurial ointment. This work of the pharmacist is also wholly unnecessary, since the ointment has been correctly prepared by means of machinery for many decades. Under these circumstances, the official process has become decidedly superannuated. It might have been, however, necessary to have an official standard of its composition. But in this respect no progress has resulted. By reason of the fatty medium, as ordinarily employed, forming an ointment of excessive firmness, almost unfit for general use, it has become a very prevalent custom to reduce its strength. In order to secure a suitable consistency, the ointment is habitually mitigated fifty per cent. Since the preparation containing 25 per cent. of mercury is that usually vended, it appears that such a form, with appropriate consistency, should be officially recognized in place of the 50 per cent. article. The Pharmacopœia now adds tincture of benzoin, for some particular reason. It is difficult to infer what office benzoin fills in this connection. If intended as a perfume to conceal the ill odor of the ointment, it fails to accomplish it. The powerful natural odor of suet cannot thus be overcome. Suet should properly be omitted from this ointment, and replaced by some less hard and less odorous fat. An excellent ointment is now found in the market which appears to contain petrolatum as a medium—at least in part. This new ointment is sold as a 50 per cent. article. It has all the desirable properties, and hence does not, in so far, warrant reduction.

Red oxide of mercury is not decomposed by petrolatum, but—as

also happens with other heavy powders when mixed with petrolatum alone—a partial separation occurs. Stearic acid, when here added, produces a mercuric stearate, showing that its presence is not admissible. When mercuric oxide is warmed with melted stearic acid, combination quickly and effectually takes place in the generation of a definite mercuric stearate. This substance is white, crystalline, and readily fusible, in these respects differing but inappreciably from stearic acid. It is somewhat less soluble in ordinary fats than the acid. When warmed with certain oils—as, for instance, cotton-seed oil—metallic mercury is promptly liberated. Its solubility in warm petrolatum and petrolatum oil is considerably greater, while remaining absolutely permanent in this connection. On cooling, these solutions congeal and form ointments of good consistency, but of somewhat irregular grain. If suitable solvents and media can be found, mercuric stearate will doubtless find some valuable uses.

The addition of nitric acid to a congealing mixture of mercuric stearate and petrolatum decomposes the former; and as the stearic acid is much more soluble in the medium than its mercuric salt, an ointment of excellent consistency results. The writer has taken advantage of this reaction for the preparation of citrine ointment. Nitric acid has but little, if any, effect when warmed with pure stearic acid, and scarcely more on petrolatum.

When a solution of mercuric nitrate is mixed with a congealing mixture of stearic acid and petrolatum, a proper merging results, and an ointment having a petrolatum color is obtained. If, however, the mixture is first warmed on a water bath for a short time, the ointment becomes of a lighter yellow, although no visible reaction occurs. Should it be desirable to make a citrine ointment having the usual color and odor of this preparation, a small quantity of lard previously heated with a little nitric acid may be mixed with the petrolatum product. The writer finds an advantage in the use of mercuric oxide for producing the nitrate. In preparing the solution, a small excess of the acid is used. The writer recommends the following formula for making ointment of mercuric nitrate:

Red mercuric oxide	1 troy ounce.
Nitric acid	1 " "
Water	180 minims.
Stearic acid	3½ troy ounces.
Petrolatum	10½ " "

Mix the mercuric oxide with the water and gradually add the nitric

acid, with constant stirring. Should some of the oxide have become hardened, rub it into powder, and gently warm the mixture until perfect solution has resulted. Melt the stearic acid with $3\frac{1}{2}$ troy ounces of the petrolatum and then gradually add the rest of the petrolatum. To the fused mixture now add the mercuric solution, and warm the whole on a water bath for 10 to 15 minutes. Finally, permit the ointment to cool, and stir it occasionally while stiffening.

ON THE DETERMINATION OF THE DIASTATIC VALUE OF MALT EXTRACTS.

By J. R. Duggan, M. D., Ph.D.

The following suggestions are based on some recent observations I have made on this subject, the details of which have been published in the *American Chemical Journal*, Vol. VII., No. 4. As these would be somewhat tedious to the general reader, only the more important conclusions have been introduced into the present article.

Many of the determinations of diastase in malt extracts that have been made heretofore, are undoubtedly erroneous, owing to the fact that certain precautions which are essential to correct results have not been generally observed. These may be stated, in brief, to consist in the use of perfectly neutral reagents, and such an excess of starch that not more than one-third is converted into maltose. Moreover, the extent of conversion is better determined by the amount of sugar formed, than by the time required to show a certain color with iodine. The use of iodine as an indicator for starch in the presence of dextrin is very unreliable, the color produced being dependent on the amount of iodine added, the temperature of the solution, and various conditions other than the extent of conversion.

All of the commercial starches from corn or potatoes contain more or less alkali from the caustic soda used in their extraction, and this cannot be entirely removed by long washing. Determinations made with these starches show a great diminution of diastatic action, owing to the retarding influence of the alkali. This in some cases amounts to as much as 90 per cent., and is seldom less than 25 per cent. Not only is the actual error considerable, but the comparative error may be almost as great. The following table shows the amount of sugar formed by varying quantities of malt extract acting on an ordinary laundry starch:

No.	Amount of Extract.	Amount of Maltose formed.
1	0·5 gram.	0·302 gram.
2	1·0 "	0·789 "
3	1·5 "	1·877 "

In the last of these experiments only three times as much extract was used as in the first, but the amount of sugar formed was over six times as great. No such error as this occurs when neutral starch paste is used.

In arrowroot we have a starch that is usually neutral, no alkali being used in its extraction, and it may therefore be used for these determinations. Distilled water should be used for making the paste, since the use of ordinary water may introduce a very large error.

The following method is suggested for the determination of the diastatic value of malt extracts. The quantities mentioned can, of course, be varied, should there be any reason for so doing; but, in general, this is not desirable, as, by observing these details, not only will correct results be obtained, but they will be directly comparable to those obtained by other observers using this method. In this way, some of the discrepancies that occur in the analyses of well-known chemists might be harmonized.

A 3 per cent. starch paste is made by adding a weighed quantity of Bermuda arrowroot to distilled water, and heating the mixture to gelatinization in the water bath. A flask containing 250 c. c. of this paste is placed in a water bath kept at 55°C., and when it has attained a constant temperature, 5 c. c. of a 5 per cent. solution of the extract in distilled water is run in, and the whole mixed by shaking. At the end of half an hour the reaction is stopped by the addition of two or three c. c. of a 10 per cent. solution of caustic soda, and the whole diluted to 500 c. c. The sugar present is determined by Fehling's solution, and this, minus the quantity contained in the extract used, is the amount formed by diastatic action. If this should be greater than one-third the starch used, another experiment should be made with a smaller quantity of extract. The sugar should be calculated as maltose (reducing power = $\frac{2}{3}$ glucose), since this is the only sugar formed in the reaction.

The following determinations of the converting power of two well-known malt extracts have been made under these conditions. In order that the samples examined might correctly represent the extracts as supplied to the whole country, they have been obtained from

well-known drug houses in different cities, and without the knowledge of any one but myself as to the purpose for which they were to be used, or of any one interested as to when or from where they were to be obtained. While exceptional cases may give different results, I am compelled to believe that these figures represent a fair average of the diastatic value of the respective preparations. It will be seen that neither of the extracts shows a uniform action, and, considering the difficulties that must be overcome in extracting diastase, I am not surprised at this variation.

The following are the results obtained:

No.	Where obtained.	Amount of sugar formed by 0·250 gram of Trommer Co.'s Extract.	Maltine.
1.	Baltimore	0·149 gram.	0·739 gram.
2.	Philadelphia	0·558 "	2·378 "
3.	Cincinnati	0·317 "	3·052 "
4.	Chicago	0·240 "	0·739 "
	Mean	0·318 "	1·727 "

BALTIMORE, *November*, 1885.

LABORATORY NOTES.

ABSTRACTS FROM THESES.

Ammonium Carbonate.—Four samples were examined by Emil Schaible, Ph.G. The solution made with dilute nitric acid was tested with barium chloride for sulphate. The solution in acetic acid was tested with silver nitrate; a precipitate insoluble in nitric acid indicated chloride, while one soluble in nitric acid and turning dark on standing was regarded as indicating hyposulphite. The same solution tested with ammonium oxalate, showed the absence of calcium salt, and the solution in dilute hydrochloric acid, saturated with sulphuretted hydrogen, showed the absence of heavy metals, while on the subsequent addition of ammonia and ammonium sulphide, No. 4 only yielded a precipitate of iron. Empyreumatic substances were tested for by sulphuric acid and potassium permanganate. The results were as follows:

	Insoluble in alcohol.	Sulphate.	Chloride.	Hypo-sulphite.	Empy-reumatic substances.	Carbonate, volumetric estimation.
No. 1.....	3 per cent.	1·7 per cent.	——	Trace.	Trace.	91·9 per cent.
No. 2.....	2·7 "	1·0 "	1 per cent.	——	——	92·2 "
No. 3.....	2·3 "	1·5 "	——	——	Trace.	91·6 "
No. 4.....	2·0 "	0·9 "	——	Trace.	Trace.	93·7 "

Mercurous Iodide.—According to George A. Haffa, Ph.G. this compound is best made by precipitation of mercurous nitrate with potassium iodide and may then be obtained of a yellow or green color according to the density of the solution. The solution of mercurous nitrate is prepared by acting upon 15,000 grs. of mercury with a cold mixture of nitric acid 6,000 grs., and water 4,000 grs., placing the vessel in cold water and stirring the contents constantly until the reaction has entirely ceased; the white crytalline mass, without being separated from the excess of metallic mercury, is then dissolved in water acidulated with nitric acid (1 oz. to the gallon) until the solution measures four pints.

For preparing *green* mercurous iodide mix solution of mercurous nitrate 6 oz. with water 6 pints, and add to it in a continuous stream and with constant stirring, a solution of potassium iodide 3 oz. in water 54 oz., decant, wash the precipitate with water and dry without the aid of heat.

For preparing *yellow* mercurous iodide operate in the same manner, but use solution of mercurous nitrate 2 oz. diluted with water 8 pints, and a solution of potassium iodide 1 oz. in water 4 pints. This salt darkens much more quickly when exposed to the light than that made by the pharmacopœial process.

Chloride of Gold and Sodium.—Two commercial samples of this salt, examined by Alfred Conard Wood, Ph.G., were found to agree in all respects with the pharmacopœial requirements, except the percentage of metallic gold, which was ascertained as directed by the Pharmacopœia, by treating a solution of 0.5 gm. of the salt with a clear acidulated solution of 2 gm. of ferrous sulphate.

No. 1 yielded 0·125 gm. gold = 25 per cent.; deficiency 7·4 per cent.
No. 2 " 0·110 " " = 22· " " 10·4 "

Acetic Ether.—Luther P. Bowers, Ph.G. has examined three commercial specimens of acetic ether with the following results: One was very impure, had the specific gravity ·924, was extremely acid to litmus paper, effervesced strongly with calcium carbonate, and afforded clear solutions with alcohol and ether, but would not dissolve in chloroform. 10 c.c. of it agitated with an equal volume of water, separated an ethereal layer of 7 c.c. The ether had an empyreumatic odor and on evaporation left a yellowish residue. The second sample had the specific gravity ·904, effervesced with calcium carbonate, and showed an undue loss on being agitated with water, but was much

better than the preceding. The third sample effervesced slightly with calcium carbonate, and had the unusually low specific gravity ·878, but otherwise answered to the requirements of the Pharmacopœia.

Acetic ether is used in the preparation of *Spiritus odoratus*, the pharmacopœial formula for which would be improved by reducing the oil of bergamot to 14 parts and increasing the acetic ether to 4 parts. *Tinctura ferri acetatis*, which contains 20 per cent. of acetic ether is best prepared as required for use, since it will gradually produce a precipitate, particularly when exposed to light.

The chief use of acetic ether is in the manufacture of artificial fruit essences; the following are good formulas:

	Artifical fruit essence of		
	Pine apple.	Raspberry.	Strawberry.
Ethyl acetate	4 parts	6 parts.	3 parts.
Amyl acetate	4 "	1 "	4 "
Ethyl butyrate	4 "	——	——
Chloroform	1 "	——	——
Spirit of nitrous ether	——	1 part.	1 part.
Tartaric acid	——	1 "	1 "
Tinct. orris root (10 per cent.)	——	24 "	24 "
Glycerin	——	24 "	24 "
Diluted alcohol	sufficient for 200 parts.		

Commercial Sulphate of Morphine.—Albert E. Brown, Ph.G., has analyzed five commercial samples of this salt, two coming from American manufacturers, one each from England and Germany, and the fifth was made by the author. The water was determined by exsiccating the salts at a temperature of 130° C. (266° F.); the sulphuric acid by precipitation with barium chloride, and the solubility by macerating an excess of the salts in distilled water, weighing the undissolved portion, and evaporating also an aliquot portion of the filtrate to complete dryness. The results were as follows:

No. 1,	water	8·53	per cent.;	sulphuric acid	13·46	per cent.;	soluble in	20·40	watr
No. 2,	"	8·02	"	"	13·52	"	"	20·61	"
No. 3,	"	8·38	"	"	13·46	"	"	20·61	"
No. 4,	"	7·80	"	"	13·59	"	"	21·66	"
No. 5,	"	8·53	"	"	13·46	"	"	20·55	"

Lime Fruit Juice.—Daniel Herr Hassler, Ph.G., has examined several commercial samples of lime juice, the results being tabulated below. The percentage of free acid was determined volumetrically. Of the acids not mentioned in the table, oxalic and malic acids were not found in any one of the samples. No. 6 showed a trace of tannin,

No. 4 a trace of nitrate, No. 3 a trace of tartrate, and No. 7 a trace of acetic acid.

Sample.	Color.	Odor.	Taste.	Spec. grav.	Chloride.	Sulphate.	Citric acid. pr ct.	Ash pr. ct.
1. Monserrat,	Bright straw.	Pleasant.	Pleasantly acid.	1·044	Trace.	—	8·54	·540
2. Von Lear...	Light amber.	Slight, pleasant.	Intensely acid.	1·020	Trace.	Slight prec.	8·12	·515
3. Cowdrey...	Dark amber.	Pleasant.	Bitter and acid.	1·041	Slight prec.	Med'm prec.	7·60	·523
4. Jamaica....	Reddish-brown, cloudy.	Musty.	Bitter and acid.	1.034	Med'm prec.	Med'm prec.	7 42	·415
5. Martinique	Light straw.	Slightly musty.	Acid and bitter.	1·042	Slight prec.	Med'm prec.	6·76	·492
6. Rose.....	Cloudy straw.	Unpleasant	Bitter.	1·023	Slight prec.	Dense prec.	6·02	·480
7. Octo.....	Light straw.	Slightly musty.	Sweetish acid then bitter.	1·026	—	Med'm prec.	2·80	·405

Assaying of Ignatia.—Silas M. Harrington, Ph.G., assayed three samples of ignatia, two of which were purchased in the powdered state, while the last one was powdered by the author. For the first sample Dragendorff's process was used: 15 gm. were boiled three times in succession with dilute sulphuric acid; the united decoctions, nearly neutralized with magnesia, were evaporated to a syrupy consistence, the residue mixed with 2·4 times its volume of alcohol, the filtrate evaporated to 30 c.c., shaken with chloroform, and after this had been removed, rendered alkaline with ammonia, and repeatedly agitated with chloroform to extract the alkaloids; these were dried, weighed, dissolved in hydrochloric acid, the solution evaporated, the salts weighed and then dissolved in water and titrated with potassio-mercuric iodide, when the weight of strychnine and brucine is calculated from the weight of the mixed alkaloids or of the salts.

The last two specimens were assayed by the process for preparing strychnine as given by the U. S. P. 1870, the brucine being separated from the mixed alkaloids by washing with diluted alcohol.

The following results were obtained:

No. 1 yielded 1·039 per cent. strychnine and 0·355 per cent. brucine.
No. 2 " 1·125 " " " 0·41 " "
No. 3 " 1·425 " " " 0·475 " "

Iodated Phenol is prepared by dissolving 4 grains of iodine in 1¼ oz. of glycerin and adding 4 grains of phenol. It has been advantageously used by Dr. Rosenfeld (Centralbl. Ges. Therap.) for dysentery in children, in the form of enema, prepared from one or two teaspoonfuls of the mixture and a glassful of water, to be given three times a day.

SODIUM CHLORATE.

By F. Holberg.

(Read at the Pharmaceutical Meeting, December 15th, 1885.)

Owing to a difference of authorities as to whether chlorate of sodium when heated to melting gives off oxygen and leaves a residue having a neutral reaction, or whether chlorine and oxygen are given off and the residue has an alkaline reaction, the following investigations were made in the Chemical Laboratory of the Philadelphia College of Pharmacy to determine the cause of this difference.

Experiment 1.—A small quantity of sodium chlorate of German manufacture was heated and gave off oxygen, the residue when dissolved in water had a neutral relation.

Experiment 2.—Some of the salt was prepared by decomposing sodium fluosilicate with potassium chlorate. The resulting salt on heating gave no evidence of anything but oxygen being given off and the residue had a neutral reaction.

Experiment 3.—Another quantity of the salt was made by acting on acid sodium tartrate with potassium chlorate. The resulting sodium chlorate on heating gave off fumes which bleached blue litmus paper, and the residue had an *alkaline* reaction.

Experiment 4.—A minute quantity of acid potassium tartrate was mixed with the pure sodium chlorate. The mixture on heating gave off fumes which bleached blue litmus paper (thus showing the presence chlorine), and the residue had an alkaline reaction.

Experiment 5.—A minute quantity of acid potassium tartrate was mixed with potassium chlorate. This mixture on heating also gave off fumes which bleached blue litmus paper and the residue had an alkaline reaction.

From the experiments made it appears, that the chlorates when contaminated with a trace of organic matter will give off chlorine and leave a residue having an alkaline reaction.

One of the processes recommended for the preparation of sodium chlorate, is by decomposing acid sodium tartrate with potassium chlorate. The salt prepared in this way has probably caused the statement, that on heating chlorine is given off and the residue gives an alkaline reaction, which is due to a trace of organic matter. For this reason sodium chlorate should be prepared by a process which will exclude all possibility of contamination with organic matter.

GLEANINGS FROM FOREIGN JOURNALS.

By Geo. H. Ochse, Ph.G.

New Method of Preparing Fehling's Solution.—M. Schmiedeberg uses mannite in place of Rochelle salt in making Fehling's solution. He claims that the addition of mannite insures stability to the solution. His formula is as follows: Dissolve 34·632 grams of crystallized copper sulphate in 200 c.c. of water; to this solution is added a solution of 15 grams of very pure mannite in 100 c.c. of water and 480 c.c. of solution of caustic soda (1·145), and, lastly, sufficient water to make 1 liter.—*Schweiz. Wochenschrift,* xxiii, p. 400.

Hypodermic Injections of Cyanide of Mercury in Syphilis.—Prochorow uses a 1 per cent. solution of cyanide of mercury hypodermically in the treatment of syphilis. After giving about 20 injections of 25 or 30 drops each the symptoms generally disappear. He has treated quite a number of patients and observed but two cases where abscesses had formed.—*Schweiz. Wochenschrift,* xxiii, p. 344.

Spiritus Saponatus.—According to Petersen, spiritus saponatus, *Phar. Ger.*, can readily be prepared by mixing the oil, caustic potash and a fourth part of the alcohol, in a glass-stoppered bottle and shaking every 3 or 4 hours. In two or three days the oil is saponified and can then be diluted with the water and remainder of the alcohol. By this method no heat is required nor is there any loss in alcohol.—*Schweiz. Wochenschrift,* xxiii, p. 362.

Properties and Preparation of Peptone.—5 kilograms of finely chopped lean beef are placed in a porcelain evaporating dish with 5 kilograms of water, 150 grams C.P. concentrated hydrochloric acid and 20 grams (Witte's) pepsin; allowed to stand at ordinary temperature for one day, stirring frequently; it is then heated in a water-bath, taking care not to heat the mixture to more than 70° C. for one day. The excess of acid is neutralized by sodium carbonate (requiring about 150–160 grams). The resulting turbid solution is brought up to 10 kilograms, 5 kilograms of concentrated alcohol added and then put aside for one day to settle. The precipitate is collected on a strainer, expressed and the liquid filtered. After recovering the alcohol the solution is evaporated to extract consistency, poured on plates and dried. Peptone prepared thus is in brown pieces, quite brittle, yielding when pulverized a yellowish-brown powder, soluble in at least 2 parts of water. Yield is about 4–6 per cent. of the meat used. *Properties:* 1. Peptone should be soluble in two parts of water; the solution is not gelatinous,

and becomes turbid on adding 5 volumes of absolute alcohol; the addition of more water makes a clear solution. 2. A 10 per cent. solution does not become turbid either at an ordinary or elevated temperature on adding nitric acid, acetic acid, ferrocyanide of potassium or saturated solution of sodium sulphate. 3. Picric acid produces yellow —tannic acid, ash-gray flakes. 4. Sulphate of copper and caustic potash produce a violet coloration. 5. It should yield not more than 2 per cent. of ash when incinerated. 6. If to 20 drops of a 1 per cent. solution of peptone 5 drops of a 10 per cent. solution of calcium bichromate are added no turbidity is produced; if the mixture becomes turbid it proves the presence of at least 5 per cent. of glutinous matter. Solution of bichromate of calcium (Freire's test) is made by dissolving 5 grams crystallized chromic acid in 25 grams of water, gradually adding 2 grams pure calcium carbonate; after effervescence the solution is diluted to 60 c.c. and filtered through glass-wool. Owing to the rapidity with which peptone is decomposed it is not advisable to keep it in liquid form.—*Schweiz. Wochenschrift*, xxiii, p. 381.

Potable Water.—The International Pharmaceutical Congress adopted the following resolutions in reference to drinking water: 1. It should be clear, transparent, colorless, odorless and free from suspended matter. 2. It must be fresh, have a pleasant taste, and a temperature not over 15° C. 3. It should contain air and a certain amount of carbonic acid. The air it contains must contain 30–33 per cent. oxygen. 4. It should not contain more than 20 milligrams of organic matter to the liter (determined by oxalic acid) and should be free from nitrogen. 5. The nitrogenous organic matter oxidized with potassium permanganate should not yield more than 0·1 milligram albuminous nitrogen to the liter. 6. It should not contain more than 0·5 milligram of ammonia in each liter. 7. A liter of water should not contain more than 0·5 gram of mineral salts, 60 milligrams anhydrous sulphuric acid, 8 milligrams chlorine, 2 milligrams anhydrous nitric acid, 200 milligrams oxides of the alkaline earths, 30 milligrams of silica and 3 milligrams of iron. 8. Drinking water should not contain any nitrites, sulphuretted hydrogen or sulphides, nor should it contain any metallic salts which are precipitated by sulphuretted hydrogen or ammonium sulphide excepting traces of iron, aluminium and manganese. 9. When kept in closed or open vessels it should not acquire a disagreeable odor. 10. It should not contain any saprophytes, leptotrix, leptomites, hypheotrix, and other white algæ,

numerous infusoria and bacteria. 11. It should not become mouldy on the addition of white sugar. 12. When cultivated on gelatin, no bacteria which liquefy the gelatin should be formed within 8 days.—See *Amer. Jour. Phar.*, 1885, p. 527, 528.

Artificial Cocaine.—By heating benzoyl-ecgonine with a slight excess of methyl iodide and a small quantity of methylic alcohol to 100° C. and evaporating excess of methyl iodide and methylic alcohol, Merck obtained a syrupy liquid containing cocaine hydriodate, from which pure cocaine was obtained. Artificial cocaine thus prepared fuses at the same temperature as natural cocaine (98°), besides showing the same reactions, thus proving the identity.—*Rundschau*, xi, p. 716.

Coloring and Bleaching of Ivory.—After removing fat by means of ether or benzin, the ivory is bleached with a mixture of equal parts of commercial peroxide of hydrogen and water, washed with water and dried. To color ivory, it is first treated with benzin or ether to remove the fat, then soaked for two minutes in a 1 per cent. solution of hydrochloric acid, washed, and allowed to remain in the warm coloring-liquor for fifteen or thirty minutes. Coloring liquors are made as follows: *Red*—Fuchsin 10 grams, water 3 liters, vinegar 100 grams; or, eosine 5 grams, water 1 liter, tartaric acid 2 grams. *Violet*—Methyl-violet 2 grams, water 1 liter, tartaric acid 3 grams. *Blue*—Methyl-blue 2 grams. *Green*—3 grams Victoria or brilliant green, water 2 liters, vinegar 100 grams. *Yellow*—Naphthol-yellow 8 grams, water 2 liters, vinegar 300 grams.—*Rundschau*, xi, p. 723.

Albumin in Urine.—Roberts recommends a mixture of 1 vol. of concentrated nitric acid and 5 vol. of saturated solution of sulphate of magnesium as preferable to nitric or picric acid.—*Rundschau*, xi, p. 754.

Methyl-Iodide—a new vesicant.—While conducting his experiments with anæsthetics, Simpson noticed that methyl-iodide produced a redness of the skin lasting for several days. Kirk is surprised that it should have escaped notice for such a long time, and attributes it to its extreme volatility. In contact with the hand for two minutes an itching and burning sensation is experienced, after the lapse of one hour the redness becomes more perceptible, and in twelve hours a small blister gradually becoming larger was produced. The blister was filled with yellow serum and totally devoid of pus, healing in several days. The operation is rendered less painful by the addition of a few drops of soda solution to the methyl-iodide. The principal objection to the remedy is that it cannot be used by the patient. Its advantages over

cantharides consist in its being less painful, and, if required, the operation can be hastened by evaporating under a watch-glass. Methyl-iodide is prepared by passing nascent hydriodic acid into methyl alcohol; it is colorless, has a pleasant odor and boils at 43° C. It is decomposed by light, the color changing to yellow or red.—*Pharm. Rundschau*, xi, p. 762.

Morrhuol, the Active Principal of Cod-Liver Oil.—M. Chapoteaut treats cod-liver oil first with an aqueous solution of carbonate of sodium at a low temperature to remove the acids, then agitates with alcohol (90°); the alcoholic solution subjected to distillation yields morrhuol. Morrhuol has an acrid, bitter taste and strong odor. It contains appreciable quantities of phosphorus, iodine and bromine, and partly crystallizes at ordinary temperatures. The quantity of morrhuol varies with the quality of the oil employed, the brown oil yielding from 4·50 to 6 in 100, the straw-colored from 2·5 to 3 in 100, and the bleached oil from 1·5 to 2 in 100. The continued use of morrhuol does not interfere with digestion, on the contrary producing a very good appetite. Dose, 20 centigrams, equivalent to 5 grams of oil.—*Union Pharmaceutique*, November 1885, p. 525, from *Bull. de Thérap.*

Solubility of Calcium Oxide and Lime Water.—Ordinary quicklime contains caustic alkali which necessitates the throwing away of the first portion in making lime water. The solubility of calcium hydrate is influenced by the length of time it remains in contact with the water, for instance, 100 cubic centimeters of lime water, made from calcined marble in two minutes, required for saturation 9·80 c.c. normal hydrochloric acid—equivalent to 1·372 grams Ca2OH in 1 liter, showing the solubility to be 1:728; the same quantity of lime water which had remained in contact with the lime six hours required 9·30 c.c. normal hydrochloric acid—equivalent to 1·302 grams of $Ca(OH)_2$ in 1 liter, showing the solubility to be 1:768; 100 c.c. lime water which had been in contact three days required 8·92 c.c. normal hydrochloric acid for saturation—equivalent to 1·249 grams CaO in 1 liter, showing the solubility to be 1:800. Temperature is known to affect the solubility very much, boiling water dissolving but half as much $Ca(OH)_2$ as water at the freezing point. The quantity of water used to slake the lime also affects the solubility. 100 parts of CaO require 32 parts of water to form $Ca(OH)_2$; if 100 parts of lime are slaked with 50 parts of water, the lime takes up just enough water to form the hydrate, excess of water is lost by evaporation. Calcium hydrate

thus formed is the most soluble, and when shaken with water quickly precipitates, yielding a perfectly clear filtrate when thrown on a dry filter. By dissolving the lime, the author noticed that oxide of calcium forms supersaturated solutions; 1 liter, at a temperature near O° C., contained 2·4 grams CaO, at 12° C., 1·8 grams CaO.—*Pharm. Centralhalle,* xxvi, p. 442.

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

By the Editor.

Continued from page 604 of the preceding volume.

Jaltomate, Saracha Jaltomata, *Schlechtendal,* s. S. dentata, *Lin.;* Solanaceæ; in the valley of Mexico, &c. The leaves are tonic and anodyne; the fruit is edible. The leaves of several Peruvian species of Saracha are employed there for anodyne cataplasms.

Jamaica, Hibiscus Sabdariffa, *Lin.;* Malvaceæ; in Southern Puebla. The calyx is used in infusion as a refrigerant; it contains according to Laso de la Vega, tartaric acid, uncrystallizable sugar, mucilage, tannin, coloring matters and salts.

Jícama, Dolichos tuberosus, *Lamarck,* and D. palmatilobus, Mociña; Leguminosæ; indigenous and cultivated for the alimentary tubers. In the state of Veracruz the alcoholic tincture of the seeds is commonly employed externally as an antipsoric, and the experiments of Drs. Casas, Gonzalez, and others have verified the efficiency of this remedy in itch, and its superiority over others.

Jumete (Candelilla), Pedilanthus pavonis, *Boissier;* Euphorbiaceæ; in hot districts of the state of Jalisco. The milk juice is violently drastic in doses of 2 or 3 drops; the root is emetic, and the branches and leaves are regarded as possessing emmenagogue and antisyphilitic properties.

Junco (Junquillo), Cereus flagelliformis, *Miller;* Cactaceæ; cultivated. The infusion of the flowers is used as a prophylactic and as a remedy for eclampsia; the juice is rubefacient, and used internally is vermifuge; must be used with caution.

Lengua de ciervo, Polypodium lanceolatum, *Lin.;* Filices; in mountainous districts. The plant is pectoral, and the fronds are regarded as possessing the mild astringent and demulcent properties of the European hart's tongue, Scolopendrium officinarum, *Swartz,* which is also indigenous to Canada and the northern United States.

Limoncillo, Dalea citriodora, *Willdenow;* Leguminosæ; in the temperate sections of Mexico. The plant is used as an antiperiodic.

Linaloe de México, Amyris Linaloe, *La Llave;* Terebinthaceæ; in hot districts along the western slope of the mountains. The wood is rich in volatile oil, and is used for perfume.

Macallo, Andira excelsa, *Kunth;* Leguminosæ; in Tabasco, &c. The description of the bark and its constituents and properties agrees with that published in the *Amer. Jour. Phar.* 1879, p. 392–394.[1] Dr. Rosado states that the wood seems to possess energetic properties, since the emanations from it produce inflammation of the eye which effect has also been observed from other species of Andira.

The following more or less well known drugs have found a place in the Mexican Pharmacopœia: Macias (mace), Maíz (corn meal, &c.), Malva (M. rotundifolia and M. vitifolia), Maná (manna), Manganesa (black oxide of manganese), Manzanilla del país (German chamomile), Manzanilla romana (Roman chamomile), Marihuana (Cannabis indica), Marrubio (horehound), Mático, Mejorana or Almoraduz (sweet marjoram), Meliloto (melilot, sweet clover), Melon (musk melon; the root emetic; the seeds diuretic and antiblennorrhagic), Membrillo (quince; the fruit, juice and seed), Mezereon, Michoacan (mechoacan root; Batatas Jalapa, *De Cand.*), Miel vírgen (honey), Mil en rama (yarrow), Mirra (myrrh), Mirtillo (the European bilberry, Vaccinium Myrtillus; used in diarrhœas), Moral (white and black mulberry), Mostaza (white and black mustard seed), Musgo de Córcega (Corsican moss), Nabo (turnip; pectoral), Naranjo agrio (bitter orange; the leaves, flowers, pericarp and juice of the fruit), Nogal (walnut; the leaves, pericarp and kernel, the latter for obtaining its fixed oil), Nuez moscada (nutmeg), Nuez vómica, and Ñamole (poke root and berries).

Maguey manso, Agave potatorum, *Salm,* and A. salmiana, *Hort.;* Amaryllidaceæ; in the Mexican valley, the plains of Apam, Tlaxcala, &c. The leaves are rubefacient and epispastic, and are employed for frictions in tetanus; the root has diuretic, diaphoretic and antisyphilitic properties. The leaf-fibres are used for making ropes, various textile fabrics and paper. The juice is known as aguamiel (see *Amer. Jour. Phar.* 1885, p. 234), and this by fermentation yields:

Pulque, Vinum agaves. This liquid has a milky appearance, a

[1] A sample of macalline described in 1879, was sent to us by Mr. Dondé in 1880, and proved to be mainly calcium sulphate. We have not seen any later researches on macallo bark.—Editor.

peculiar odor and a sweet agreeable taste; the acid reaction becomes stronger by age; on warming it becomes clear, forming a viscous scum and separates the substances held in suspension; the specific gravity varies in the different stages between 1·102 and 0·9943. Rio de la Loza obtained from pulque albuminoids, gum and resin 12·57, sugar 8.23, salts soluble in water 1·68, salts soluble in acids 0·37, insoluble salts 0·15, alcohol 36·80, water and gaseous products 940·20. The ash contains chlorides, carbonates, sulphates, phosphates and silicates of sodium, potassium, calcium, magnesium and aluminium. Boussingault found in a liter of pulque 58·96 gm. alcohol, 2·10 glycerin, 1·40 succinic acid, 0·61 carbonic acid, 5·50 malic (?) acid, traces of butyric and acetic acids, 0·50 gum, 0·05 ammonia, 0·85 potassa, 2·50 lime, magnesia and phosphoric acid, 1·90 nitrogenous matter, and 901·83 water and undetermined substances. The composition of pulque varies with the species of maguey and with the aguamiel from which it is prepared. The ferment of this beverage is a fungus, which Dr. Barragan has recognized as being a species of Cryptococcus. A. Herrera has succeeded in preserving this liquor by adding to the liter 60 gm. of pure alcohol. It is tonic, analeptic, stimulant and diuretic.

Maguey meco, Agave lutea; in Central Mexico. The purified juice of the leaves is made into a syrup, which has pectoral properties.

Mamey, Lucuma Bonplandii, *Kunth;* Sapotaceæ; in hot and moist regions of the western slope of the Mexican mountains. The seed contains hydrocyanic acid and an irritating fixed oil; the fruit is comestible and the bark of the tree is bitter and astringent.

Marañon, Anacardium occidentale, *Lin.;* Terebinthaceæ; in Yucatan. The peduncles are pectoral; the gum which exudes from the bark, is used in the same manner as gum mezquite; the juice of the pericarp of the cashew-nut, contains anacardic acid and the ver yacrid principle cardol, and is used as a vesicant and for destroying warts.

Maravilla, Mirabilis dichotoma, *Lin.;* Nyctaginaceæ; in Central Mexico. The root is drastic in doses of 8 to 10 gm.

Mastuerzo, Tropæolum majus, *Lin.;* Tropæolaceæ; cultivated. The juice of the leaves of the Indian cress is used as an antiscorbutic, and the infusion of the flowers as a digestive. The buds preserved in vinegar are employed as a condiment and the flowers for salad.

Mazatetes, Valeriana toluccana, *De Candolle;* Valerianaceæ; in fields in the states of Mexico and Michoacan. The tubers (tubérculos) contain an abundance of valerianic acid, are employed the same as

valerian and are popularly believed to be useful for the cure of hepatitis and other affections of the liver.

Salvia grandiflora, *Ettlinger*, is in some localities used as a substitute for sweet marjoram, with which its properties seem to agree.

Mispatle, Buddleia verticillata, *Kunth;* Scrophulariaceæ; in the Mexican valley. The decoction of the leaves is used as a vulnerary.

Monacillo, Hibiscus pentacarpus, *Lin.;* Malvaceæ; cultivated. Though employed as an emmenagogue, the plant is merely emollient. The monacillo amarillo, Sida picta, *Hooker*, is used in the same mannner.

Muérdago, Loranthus calyculatus, *De Cand.*, Loranthaceæ. A substitute for the European mistletoe. The decoction of the leaves and flowers is resolvent and vulnerary, and the distilled water is a good cosmetic.

Muitle, Sericographis Mohuitli, *De Cand.;* Acanthaceæ; in Jalapa, and cultivated in other states. The leaves are stimulant and the infusion has considerable reputation as a remedy for dysentery. They yield an amorphous, inodorous, and nearly tasteless, dark-blue coloring matter which is soluble in water, resembles litmus in its reactions, and is superior to the latter as a dye.

Ninfa, Nymphæa odorata, *Aiton;* Nymphæaceæ; in the Mexican valley and other countries of America. Astringent and alimentary. The seeds are popularly known as "cabeza de negro."

Ocuje de la Habana; the resin produced by Calophyllum Calaba, *Jacquin;* Guttiferæ; in Cuba. Vulnerary; popularly believed to *cure* hernia.

Ojo de gallo, Sanvitalia procumbens, *De Cand.;* Compositæ; near the city of Mexico, &c. The infusion is used in indigestion.

Ojo de venado (cowage), olívo (bark, leaves, fruit and resin, the latter for perfumery and for sealing-wax), opio, opoponaco (opopanax), orégano, ororuz (glycyrrhiza), ortiga (nettle leaves), palo del Brasil Brazil wood), palo de campeche (logwood), papa (potato), perejil (parsley), peritre de África (pellitory), petróleo, pez de Borgoña (Burgundy pitch), Pimiente gorda (allspice), pimiente larga (long pepper), pimiente negra (black pepper), piña (pineapple), poleo (pennyroyal), polígala de Virginia (senega) and pulmonaria (lung-moss, Sticta pulmonaria) are recognized by the pharmacopœia.

Ombligo de Vénus, Hydrocotyle umbellata, *Lin.;* Umbelliferæ; in the Mexican valley. The juice is used as an emetic, and the leaves

in various liver affections. The plant, which is also indigenous to North and South America, is supposed to have the properties of the Asiatic pennywort, H. asiatica, *Lin.*

Lippia origanoides, *Kunth* (Verbenaceæ) is used in Mexico in place of origanum.

Oreja de burro, Echeverria coccinea, *De Cand.;* Crassulaceæ; in the mountains surrounding the Mexican valley. The fresh leaves are emollient. E. pulverulenta, *De Cand,* which is quite common in gardens, has the same properties.

ACONITINE.

By K. F. Mandelin.

A sample of japaconitine, obtained from Merck, was found by the author to agree exactly in its chemical and physiological behavior with aconitine. From this, the author infers that the two substances are identical, and he considers that the chief point of difference insisted upon by Wright and Luff, that japaconitine gives no apoderivative, is not to be relied on, as it rests on the estimation of a very small quantity of water. Langgaard's figures of the comparative toxic powers of japaconitine and aconitine are also no criterion, as the *dosis lethalis* he quotes for the latter is much too high, while the figures he gives for the former agree in the main with those obtained by the author for aconitine.

The author has also been unable to detect any difference between pseudaconine and aconine; the differences observed by Wright and Luff he attributes to the presence of undecomposed pseudaconitine in the preparation of pseudaconine. The aconitines are thus analogous to the tropines.

The old tests for aconitine are described by the author as worthless. Pure aconitine should give a colorless solution in concentrated sulphuric acid, which should not be darkened by the addition of a few drops of strong sugar solution. This substance is also precipitated in very dilute solutions by mercuric bromide, picric acid, and other reagents, whilst aconine is only thrown down in stronger solutions. Pseudaconitine may be recognized by its yielding protocatechuic acid when treated with potash, by its reaction with fuming nitric acid and alcoholic potash, and by its behavior with sulphovanadic acid. Evaporated on a watch-glass, with a little fuming nitric acid, a yellow residue is obtained, which gives a purple-red

coloration on addition of alcoholic potash. A solution of pseudaconitine in strong sulphuric acid yields a violet coloration with sulphovanadic acid. With all these reagents, aconitine gives negative results.

About 3 mgrms. of aconitine would be sufficient to kill a man, whilst as a medicinal dose not more than 0·1 mgrm. should be taken at once. The author recommends the pharmacodynamic method as the best one for estimating the strength of an aconitine preparation.

In conclusion, the author states that the alkaloids acolyctine and lycoctonine, obtained by Hübschmann from *A. Lycoctonum*, are not identical with aconitine and pseudaconitine.—*Jour. Chem. Soc.* 1885, p. 911, *Arch. Pharm.*, 1885, p. 161–177.

THE COMPARATIVE STRENGTHS OF CERTAIN PREPARATIONS OF IPECACUANHA.

By W. A. H. Naylor.

(Read before the British Pharmaceutical Conference.)

The remarks that the wine of ipecacuanha of the British Pharmacopœia is unsatisfactory when viewed from a pharmaceutical standpoint, will be unanimously endorsed by those who have had experience of the making and storing of this preparation. The observation that it deposits emetine on keeping has been recorded from time to time by practical pharmacists. That the quantity of alkaloid apt to be precipitated is considerable has been demonstrated, notably by Brownen. It is not, therefore, surprising that its use by medical practitioners should have yielded disappointing results, and they should have had recourse to other preparations of the drug which, on the representations of specialists, held out the promise of being more uniform in their action and certain in their effects. It was the knowledge of these facts that suggested to me the desirability of instituting an inquiry into the alkaloidal value of the preparations in common use. For this purpose selection was made of the vinum ipecacuanhæ B.P., extractum ipecacuanhæ fluidum U.S.P., and acetum ipecacuanhæ.

The mode of procedure consisted in taking a commercially good sample of the root, half of which was bruised as directed by the authoritative formula, the remainder being reduced to a fine powder and passed through a sieve having sixty meshes to the linear inch. From the fine powder there were made a wine, fluid extract, and vinegar, the

first according to the strength prescribed by B.P., the second in accordance with the directions of the U.S.P., and the third by the use of the dilute acetic acid of the B.P. in the proportion of 1 in 20. The vinegar was prepared, like the wine, by maceration for seven days with occasional agitation, the operation of shaking being performed on both at practically the same time. From the "bruised" portion wine and vinegar only were made.

Process of Assay.—The difficulty in making choice between rival processes for the determination of the emetine was considerably enhanced by the knowledge that the chemistry of this alkaloid is at the present moment in a transitional state. Added to this was the existence of foreign organic matter in one of the menstrua employed, and the method to be adopted must be uninfluenced by the extractive of the sherry. Further, it was necessary to guard against the introduction of manipulative difficulties which might ensue from operating upon too large a volume of liquid. It was also essential that the results should be *strictly comparative.* On trial it was found that the process proposed by Zinoffsky could be adapted so as to fulfil in the main these conditions. The sample of ipecac. of No. 60 powder was assayed as follows:—

To 15 grams of the drug were added 150 c.c. of alcohol (90 per cent.) and 15 drops of dilute sulphuric acid, and shaken during twenty-four hours. At the end of this time 100 c.c. of the liquid were filtered off, the alcohol evaporated, and the residue taken up by water was titrated with Mayer's solution, 1 c.c. of which corresponded to ·0189 gram of alkaloid. The point at which precipitation ceases marks the end of reaction. To beguile the tedium consequent upon the patient watching for the subsidence of the precipitate after each addition from the burette, and to ensure a greater degree of accuracy, it is advisable to make two rough determinations, the third or fourth can then be performed with rapidity and precision.

Examination of Wine and Fluid Extract.—A given volume of each was evaporated until free from alcohol, an excess of lime was added and a gentle heat applied until a dry residue was obtained. The respective residues were exhausted with strong alcohol and acidified with sulphuric acid, the spirit was removed by distillation and evaporation, and the products were treated with a definite amount of water and titrated.

The vinegar of ipecac was similarly examined, in this case the excess

of lime being added after reduction by evaporation to a low bulk. In working the process, the volume operated upon ought not to be less than 400 c.c. of the wine and vinegar, and 20 to 40 c.c. of the fluid extract. It is also imperative that the solutions to be titrated, representing as they do approximate amounts of alkaloid, should be made up to the same measure.

In tabulating the average results obtained, it may be interesting to include the percentage numbers, which were furnished by the titration of the simple residues left behind on the evaporation of the three preparations. Not only do they well illustrate the disturbing effect of the organic matter present, but they also supply the chief reason for selecting the process of assay which has been adopted.

FROM PORTION OF SAMPLE IPECAC. IN NO. 60 POWDER.

	No c.c. taken.	Bark equivalent in grams.	Alkaloid equivalent to 100 grams of bark.
Vinum ipecac.....	400	20	0·756
Acetum ipecac.....	400	20	0·836
Ext. ipecac. fluid.....	40	40	0·720

FROM PORTION OF SAMPLE IPECAC. "BRUISED."

	No c.c. taken.	Bark equivalent in grams.	Alkaloid equivalent to 100 grams of bark.
Vinum ipecac.....	400	20	0·604
Acetum ipecac.....	400	20	0·756

FROM SIMPLE RESIDUES.

	Sample in No 60 powder. Alkaloid equivalent to 100 grams of bark.	*Sample "bruised."* Alkaloid equivalent to 100 grams of bark.
Vinum ipecac.....	3·30	2·26
Acetum ipecac.....	2·45	2·00

Percentage of Alkaloid in Sample Ipecac. 1·09.

So far as emetine may be taken as representing the therapeutic value of ipecacuanha, the inference to be drawn from these figures is obvious. First, that of the three preparations which were made and examined, the vinegar was the strongest; secondly, that the alcohol and acetic acid employed in the extraction of the medicinal properties exerted a greater solvent power when the drug was in fine powder than when it was simply bruised. The possibility that these results might be serviceably applied towards the production of a stable and active vinum ipecacuanhæ, suggests an inquiry foreign to the objects of this note.—*Phar. Jour. and Trans.*, December 12, 1885.

THE COCHINEAL INDUSTRY IN GUATEMALA.

The following paragraphs, describing a visit to a "cochineal range" in Guatemala, are taken from the *Montreal Daily Star*:—

"In this queer country the raising of hemipterous insects of the bark-louse family—especially the *Coccus cacti* or Spanish cochinilla—is a profitable, if not a pleasant, industry. In this portion of Guatemala vast plantations are given up entirely to the cultivation of the "Indian fig," or nopal, of the genus *Cacti* (*Opuntia cochinillifera*), upon which these bark-lice feed.

"Senor Espanosa's plantation of *Opuntia cochinillifera*, which was the one we visited, includes nearly a thousand acres, and the *modus operandi* of cultivating the insect is most curious. They require about the same care that is ordinarily bestowed upon silk worms, and the occupation is not more disagreeable among crawling bugs than wriggling worms. Immediately before the annual time of violent rains, great branches of the nopal, covered with insects, are cut off and stored in a building erected for the purpose, to protect them from the weather. At the close of the wet season, four or five months later (about the middle of October), the plantations are again stocked from these supplies, by suspending little nests made of henequin, maguey, jute or any sort of woody fiber, upon the spines of the growing cacti, each nest containing about a dozen females. Warmed by the tropic sun, the insects soon emerge from their semi-comatose condition, and begin to lay eggs with marvellous rapidity, each female producing more than a thousand young. These spread over the plants with marvellous celerity, the young females attaching themselves to the leaves and immediately swelling to incredible size, adhering so closely to the nopal as to become almost a part of it, resembling vegetable excrescences rather than animated creatures.

"In this condition they are gathered for cochineal, none but the pregnant females being valuable for commercial purposes. The males are comparatively few in number—not more than one to two hundred and fifty females—and are of no use for coloring purposes; but, as in the higher orders of existence, escape most of the pains and perils of life. While the males are thus left to disport themselves undisturbed, the females are picked off with a blunt knife, collected into baskets and killed by dipping into boiling water, or baking them in a heated oven, or on plates of hot iron. The first crop is gathered about the middle of December, and subsequently several more of as many suc-

cessive generations—the last for the year being late in May. These tiny insects, of the family *Coccidæ*, are in the form of rounded scales, the body covered with deep, transverse wrinkles, abdomen of dark mulberry color, with short, black legs, and bristly on the posterior part. The male has two erect wings, the female none.

"A laborer of ordinary skill can pick only about two ounces of cochineal bugs in a day. These lose at least two-thirds of their weight in the process of drying. As it requires no less than seventy thousand insects to weigh a pound, and the average retail price of cochineal is only sixty cents per pound, it may be inferred that the business is by no means a sinecure. By the method of immersing the insects in boiling water they turn to a reddish-brown hue, losing much of the white powder with which the wrinkles of their bodies are loaded. When dried in an oven they retain this, and then their color is grey, and when killed on hot iron they become black. This is the cause of the varieties known in the market as 'silver grains,' 'black grains' and 'foxy,' the latter (killed by the first plan) being preferred. When dried, the cochineal presents the form of convex grains, each about an eighth of an inch in diameter, with the transverse wrinkles still visible.

"An inferior quality of insects, called *sylvestre*, which is indigenous to a wild species of cactus, is frequently gathered and sold for the better variety, and sometimes the species become mixed without design on the part of the planter. Occasionally a bug distemper breaks out and devastates entire plantations, as in Guatemala a few years ago, when the haciendos were obliged to clean out the old stock, root and branch, and begin anew. The *Coccus cacti* are also fed upon by birds, mice and the larvæ of other insects—the latter destroyers sucking out their bodies and leaving only the empty skins."—*Phar. Jour. and Trans.*, Nov. 14, 1885, p. 414.

Behavior of the Bile Acids with Gelatin and Gelatin Peptones.—By F. Emich (*Monatsh. Chem.*, vi, 95–103.—Glycocholic acid does not preciptate gelatin solutions, but taurocholic acid does, even from very dilute solutions, and in a very complete manner; the taurocholic acid cannot be removed from the precipitate by boiling alcohol. 1 part of gelatin combines with from 0·68 to 1·49 parts of taurocholic acid.

Taurocholic acid precipitates gelatin peptone but only incompletely. These reactions are of physiological importance.—*Jour. Chem. Soc.*, 1885, *pp.* 822.

CARMINE.

By M. Dechan, F.C.S.

(Read before the British Pharmaceutical Conference.)

The discovery of carmine is generally supposed to have been accidentally made by a Franciscan monk while engaged in the preparation of some medicament from the body of the cochineal insect, which was at that time (about the sixteenth century) and is even now considered by many to possess valuable medicinal properties.

Preparation of Carmine.—In the preparation of commercial carmine no attempt is made to produce a compound possessing a constant chemical composition, the prime object of the manufacturer being to obtain a substance having certain well-marked physical properties. I have selected the following methods from those given in standard works, for the purpose of showing that we may expect to find considerable diversity in the composition and general characters of this substance.

China or Spirit Process.—One pound of cochineal is boiled for fifteen minutes in 3 gallons of water, then 1 drachm of powdered alum is added, and the whole boiled for five or six minutes longer. When the liquid has become cold, the clear portion is decanted, and again heated. Tin spirits is now cautiously dropped in until all the carmine is precipitated; it is then collected, drained and dried.

French Process.—The quantity of cochineal and water is the same as in the preceding method, and after boiling fifteen minutes 1 ounce of cream of tartar in powder is added, and the boiling further continued for ten minutes, when $1\frac{1}{2}$ ounces of alum are thrown in. After two minutes' boiling the heat is withdrawn, and in five or six minutes more the clear portion is decanted into porcelain vessels, which are set aside until the carmine falls down.

English Process.—One pound cochineal and $\frac{1}{2}$ ounce carbonate of potash are boiled for fifteen minutes in seven gallons of water. The heat having been withdrawn, 1 ounce of powdered alum is added; the whole is well agitated and allowed to settle for about fifteen minutes. The clear liquid is next decanted into a clean copper, and $\frac{1}{2}$ ounce isinglass having been added heat is applied until coagulum forms on the surface; it is then stirred briskly and allowed to settle.

Madame Cenette's Process.—This process is said to yield carmine of extraordinary lustre and beauty. The carmine is said to be prepared by this method without the use of either alum or tin spirits, but I have utterly failed to prepare carmine by it, although the specified

conditions were scrupulously adhered to. I have subsequently learned that my efforts in this direction had been anticipated by Hugo Müller, who tried, but evidently in vain, to obtain carmine by Cenette's process; the only and invariable result being a rich crop of mould.

From the results obtained by using the above methods I have come to the conclusion that carmine is not a true chemical compound, but that it is a complex mixture of several compounds. Experiments instituted for the purpose of determining whether carmine could be prepared without the use of alum or tin spirits have very clearly established the fact that either of the bases, aluminium or tin, is necessary for its production.

Composition of Carmine.—Some authorities state that carmine is simply the alumina salt of carminic acid; but this does not increase our knowledge of its exact composition, and no two investigators have been able to agree as to what the true constitution of this acid is. Pelletier and Caventou, in a communication to the Institute de France (1818), gave the following as the percentage composition of the coloring matter of cochineal:—

Carbon.	Hydrogen.	Oxygen.	Nitrogen.
49·33	6·66	40·45	3·56

Warren de la Rue submitted this substance to a careful examination and succeeded in separating the coloring matter in, what he considered, a pure state, and at the same time discovered that the substance now known as nitro-coccusic acid was one of the products of the decomposition of cochineal. The pure coloring matter was named carminic acid, and its composition as determined by W. de la Rue is:—

	Theory.	Found.	Formula.	Adopted.
C	54·19	54·13	168·	C_{14}
H.	4·52	4·62	14·	H_{14}
O	41·29	41·25	128·	O_8
	100·00	100·00	310·	

This agrees with the composition of copper carminate as analyzed by the same investigator.

Schutzenberger, in his investigations on the constitution of carminic acid, noticed a considerable variation in the composition of carminic acid of different preparations. He came to the conclusion that W. de la Rue had been experimenting on a mixture of several substances. The composition of carminic acid as determined by Schutzenberger is $C_9H_8O_5$, which differs very materially from that given by W. de la Rue.

Schaller in his researches obtained results which differ from those of Schutzenberger by H_2O. He also gave it as his opinion that carminic

acid was dibasic, and therefore capable of forming normal and acid salts.

Hlasiwetz and Grabowski came to the conclusion that the carminic acid as prepared by the previous investigators was a glucoside, for on treating it with boiling dilute acid it was found to yield a peculiar kind of sugar and a substance which they named carmine red, the analysis of which led to the formula $C_{11}H_{12}O_7$.

The results obtained by the repeated ultimate analysis of several samples of commercial carmine exhibited such a wide variation that I was irresistibly led to the conclusion that the formation of carmine was the result of a species of physico-chemical action, and that the products of such action will largely depend on the conditions under which it takes place. Many striking examples of this peculiar reaction may be observed in the dyeing of wool and other fibres, where an extremely small quantity of a base may be made to unite with varying proportions of coloring matter. I am therefore of opinion that it is scarcely possible to obtain carmine of a uniform and fixed chemical composition; consequently, we must adopt some other standard by which to gauge the purity of the commercial article.

This, to a certain extent, has already been decided by the fact that the alumina or tin compound of cochineal is readily soluble in dilute ammonia, whereas the substances with which it is liable to be adulterated are, as a rule, not soluble in this menstruum.

It must not, however, be assumed that everything soluble in dilute ammonia is pure carmine; *i.e.*, accepting carmine as a compound of alumina or tin with the coloring-matter of cochineal. Tin spirits form with aniline scarlet a compound which very much resembles carmine physically and chemically, being like it soluble in dilute ammonia and insoluble in water.

The foreign substances which are likely to be mixed with carmine and which are separated from it by means of dilute ammonia, are vermilion, chrome red, albuminous or starchy matters, and uncombined alumina; aniline carmine, not being separated, must be tested for in the ammoniacal filtrate.

The method adopted in the examination of ten samples, the result of which will be found in the appended table, was as follows:—The quantity taken for analysis was 0·2 gram. This was digested in dilute ammonia with frequent stirring for twenty minutes, then poured on a tared filter and washed with ammonia until all traces of carmine had disappeared. The filter was dried at 100° C. and weighed, and the

percentage of matter insoluble in ammonia calculated. The residue on the filter was now washed with dilute hydrochloric acid and distilled water, again dried and weighed; in the absence of chrome red, the loss in weight was calculated as uncombined alumina and lime. The substance left on the filter, after washing with hydrochloric acid was ignited and the loss calculated as albuminous and starchy matters. If vermilion was present the mercury was determined by a combustion analysis, and the proportion of sulphide to the other substances calculated. In all cases the ash of the whole substance was determined, as well as the ash of the insoluble residue.

The following simple method was adopted for detecting the presence of aniline carmine in the ammoniacal filtrate. Small pieces of clean white woolen cloth were boiled for thirty minutes in the solution, and the tint of color produced carefully examined. From a series of comparative experiments it was found that 1 per cent. of aniline carmine mixed with cochineal carmine manifests its presence quite distinctly, the color assuming a red-orange tint, whereas with pure cochineal carmine it is of a reddish-purple shade. None of the samples contained any aniline carmine; and it is well to know that this substance need not be looked for if oxide of tin is absent in the ash of the whole substance.

That the carmine of commerce is not above suspicion will be seen from the appended table in which are summarized the results of the examination of ten samples obtained from different parts of the country. In one case only was the purchase accompanied by any qualification as to purity, the seller of No. 7 stating that the material supplied was only of second rate quality.

The alumina and lime given as combined in the table is that which has entered into combination with the coloring-matter of the cochineal. This combination must not be considered as purely chemical, as it partakes of a physico-chemical nature; hence an exact numerical proportion must not be looked for between the combined alumina, lime, and coloring-matter.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No.10.
Carmine (coloring-matter).....	6·1	69·2	34·1	65·7	60·8	69·5	26·1	72·0	18·4	67·5
Combined alumina and lime	8·0	9·8	11·4	12·0	9·0	7·0	0·4	8·1	4·4	10 0
Matter insoluble in ammonia. Organic.....	1·8	2·5	18·5	0·0	9·8	0·0	0·0	8·0	52·4	9·5
Matter insoluble in ammonia. Asn.....	2·0	2·4	34·0	Tr.	0·2	Tr.	14·6	1·9	3·6	Tr.
Matter insoluble in ammonia. Vermillon							50·4			
Moisture.....	22·1	16·1	2·0	22·3	20·2	23·5	8·5	10·0	21·2	13·0
	100·0	100·0	100·0	100·0	100·0	00·0	100·0	100·0	100·0	100·0

—*Phar. Jour. and Trans.*, December 12, 1885.

NOTE ON THE PREPARATION OF AMYL NITRITE.

By John Williams, F.I.C., F.C.S., and Miles H. Smith, F.C.S.

(Read before the British Pharmaceutical Conference.)

Understanding that Mr. A. H. Allen was preparing a paper for this meeting of the Conference upon the result of testing the strength of amyl nitrite by the very ingenious and useful instrument, the "nitrometer," which he has lately improved and brought under the notice of pharmacists, it appeared to us that it would be of interest to the meeting if we gave an account of a few experiments we have lately undertaken to, if possible, settle certain points in the manufacture of this article. We were induced to undertake these experiments in consequence of the discussion which has lately taken place before the Chemical Society and elsewhere, in which Professor Armstrong, Messrs. Ramsey and Cundall, and Mr. Lunge have taken part, the main question being if nitrous acid (N_2O_3) could exist in the state of gas or not, but the experiments also showing that very various results, as far as regards the nature of gas given off by the action of nitric acid upon arsenious acid or starch, could be obtained by slight variations in the conditions under which the experiment was conducted. It is not our wish or intention to offer any opinion upon the main question in dispute, but we think some of our experiments, although rather rough, may perhaps throw some light upon the question; at any rate we hope they will prove of sufficient interest to warrant their being recorded.

The process we adopt for preparing nitrite of amyl is at first sight a very simple one. A gas which we have hitherto assumed to be nitrous acid (N_2O_3) prepared by acting upon arsenious acid by nitric acid is passed into amyl alcohol, previously purified and kept carefully cooled. A considerable quantity of the gas is absorbed and the passage of the gas is continued until the alcohol is saturated, this being shown by a change of color from bright yellow to brownish green; beyond this point it is not advisable to carry the operation. The product is then well washed and afterwards subjected to distillation, a thermometer being inserted in the retort (but not touching the liquid) so that the boiling point may be observed and the liquid fractioned if necessary. The liquid generally begins to distil at from 80° to 85° C., and the boiling point may rise very considerably if the sample is not pretty pure. The boiling point of pure nitrite of amyl is variously stated by good authorities, some putting it as low as 90° to 92° C.,

others as high as 98° to 100°. Probably 95° or 96° may be the correct point; our experiments rather tend to confirm that temperature as the correct one. Of course the effort of the manufacturer is to obtain from a given amount of material the largest possible quantity of a product boiling under or about 100° C., and in practice we consider the operation a successful one when we obtain $\frac{9}{10}$ of the result distilled at that point. It not unfrequently occurs, however, that the result is anything but satisfactory, and at one time we had great difficulty in accounting for the discrepancies observed. We have now been engaged for some time past in a series of experiments to try and determine if possible under what circumstances the best results were obtained, and to discover, if possible, the cause of the failures we sometimes met with. We should mention that in all our experiments we have employed the same sample of amyl alcohol. This had been carefully purified and distilled in a current of steam several times; it probably still contained traces of ethylic alcohol, and possibly other bodies, but was as pure as could be readily obtained by ordinary means. The so-called nitrous acid gas was in all cases made by the action of nitric acid upon arsenious acid. We did not employ starch, as although the gas so produced appears to have some advantages over that prepared from arsenious acid, the manipulation is very troublesome on account of the large amount of frothing which occurs during the process.

Experiment No. 1.—The nitric acid employed in this case was of sp. gr. 1500, as recommended by Ramsey and Cundall in a paper lately read before the Chemical Society. The red gas produced was almost entirely absorbed by the amyl alcohol, mere traces of unabsorbable gas escaping. There was a strong tendency for the amyl alcohol to heat up, and some care was required to prevent this happening. The product washed and distilled gave the following results:—

42	per cent.	came	over under	100° C.
64	"	"	"	105° C.
74	"	"	"	110° C.
85	"	"	"	120° C.

The remaining fifteen parts left in the retort were not further examined. The result was considered a very bad one, but we shall allude to it further on.

Experiment No. 2.—Nitric acid, sp. gr. 1420, was used; the gas was fairly absorbed; more unabsorbable gas, however, escaping than in

the first experiment. The tendency of the amyl alcohol to heat up was much less marked. The washed product distilled gave—

73 per cent. under.....100° C.
84 " " 105° C.
88 " " 110° C.

This result was much better than the first one, but cannot be considered altogether satisfactory.

Experiment No. 3.—Nitric acid of sp. gr. 1350 was now employed; the quantity of gas absorbed was considerable, but much more unabsorbable gas was produced than in the previous experiments. The tendency for the amyl alcohol to heat up was very much diminished. The product distilled gave—

89 per cent. under.....100° C.
95 " " 105° C.

This was considered very satisfactory.

Experiment No. 4.—We now employed acid of sp. gr. 1300; this is the strength of acid recommended by Liebig, and since by Stenhouse and Groves in a paper read before the Chemical Society in 1877. In this case it was found that most of the gas given off was incapable of absorption by the amyl alcohol; still a small percentage was absorbed, and after passing a very considerable amount of the gas through the alcohol the reaction was effected, and the product, washed and distilled, gave—

93 per cent. under.....100° C.
95 " " 105° C.

This result was very good, but wasteful on account of the large quantity of gas which had to be employed.

Experiment No. 5.—In this experiment we varied our process somewhat, and employed a mixture of gases, with very satisfactory results.

In a glass vessel fitted with exit tube and stoppered acid funnel, a quantity of pure nitrite of sodium together with a little water was placed, and to the mixture nitric acid was allowed to flow slowly in. The resulting gas was not as might have been expected nitrous acid (N_2O_3), but was clearly nitrogen peroxide (NO_2). It was colorless until allowed to come in contact with the air, when it gave dense red fumes, and was not to any appreciable extent absorbed by amyl alcohol. The gas thus produced was passed into the upper part of a vessel containing arsenious acid and nitric acid sp. gr. 1500, and giving off the red gas, as mentioned in our experiment No. 1. The two gases were

allowed to mix, taking the precaution to keep the gas evolved from the nitrite of sodium in considerable excess. The mixed gases were passed into amyl alcohol kept cool as usual. There was no excessive tendency to heat up. Much gas was absorbed, but of course some passed through unabsorbed. The washed product distilled gave—

10 per cent. under..... 90° C.
87 " " 100° C.
93 " " 105° C.

This result being promising the experiment was repeated with perhaps greater care, and taking special precautions to keep the nitrogen binoxide in excess. The result obtained was—

9 per cent. under 90° C.
95 " " 100° C.

This being the best result as yet obtained.

Experiment No. 6.—The experiment just detailed (No. 5) was repeated, with certain modifications; in place of the nitrite of sodium and nitric acid, to produce the NO_2, copper turnings and nitric acid were used, and the arsenious acid was acted upon by nitric acid of sp. gr. 1520, or the very strongest commercial article. We found it necessary to use the arsenious acid in lumps, otherwise the action became so violent as to endanger the apparatus. In this experiment great care was taken to keep the nitrogen peroxide gas evolved from the copper turning and nitric acid in large excess. The result obtained was—

12 per cent. distilling under..... 90° C.
95 " " " 100° C.
97 " " " 105° C.

This leaving three parts only unaccounted for. We need hardly say this result was considered as perfect as could be expected.

As a general result we think these experiments show that amyl alcohol can be usefully employed to determine, at any rate to some extent, the nature of the gases evolved by the action of nitric acid of various strengths upon arsenious acid.

In experiment 1, where nitric acid of sp. gr. 1500 was used, we suppose there can be no doubt that the gas evolved was very nearly pure nitrogen tetroxide (N_2O_4). It is stated in chemical works that this gas acting upon amyl alcohol is broken up into nitrous acid N_2O_3 and nitric acid. The nitrous acid naturally produces some nitrite of amyl, and in our experiment the quantity found appears to be only 42 per cent. What other products are obtained by the action of the nitric

acid produced we are unable to say. Some nitrate of amyl (boiling at about 140° C.) may be among the products, or other more highly oxidized bodies, but upon that question we offer no opinion. We think it also becomes evident that acids of more moderate strength, such as 1420 or 1350, yield the best results, and when acid of 1300 is employed but little more than nitrogen peroxide NO_2 is yielded. What the nature of the mixed gas produced in our experiment No. 5 and 6 may be, we do not venture to offer an opinion upon. It may consist of the two gases NO_2 and N_2O_4 in a mere state of mixture, or it is possible that union may be effected, and that the gas consists mainly of N_2O_3 or nitrous acid. The gas certainly acts upon amyl alcohol very much in the way we should expect nitrous acid to do; but if it is true that such a gas does not exist, we are driven to conclude that union takes place when the mixed gases come in contact with the amyl alcohol, which is somewhat difficult to realize.

As a practical result we think our experiments prove that any process in which nitric acid is allowed to come into actual contact with amyl alcohol, even if copper turnings or other deoxydizing agents be present, and especially under the influence of a high temperature, is one not to be adopted, but should be condemned both on theoretical and practical grounds. We lately had an opportunity of examining a sample of nitrite of amyl said to be made by the action of nitric acid in the presence of copper upon the alcohol; we were not surprised to find it a very impure and inferior article, which opinion was quite confirmed by subjecting it to the nitrometer test.

These experiments may also throw some light upon the question of the production of nitrite of ethyl; but upon that subject we do not wish to enter at present.

In conclusion, we think it safe to say that the gas given off by acting upon arsenious acid by nitric acid of specific gravity 1350, or 1360, is the best for converting for ordinary commercial purposes the amyl alcohol into nitrite, unless the operator goes to the trouble of making the mixed gases, as described in experiments Nos. 5 and 6, when, doubtless, the very best result is obtained.—*Phar. Jour. and Trans.*, December 12, 1885.

Headache Essence.—Dr. W. W. Walsh has found the following preparation to give relief in many cases: Oil of lavender 1 oz., camphor ½ oz., ammonia water ½ oz., alcohol 4 oz.—*N. E. Med. Monthly*, Dec., 1885, p. 127.

CHEMISTRY OF NITROGLYCEROL.

By M. Hay.

From the resemblance of nitroglycerol to the nitrites in its physiological and therapeutical properties, the author was at first inclined to regard it as being a glyceryl nitrite instead of a nitrate, but the result of a further investigation did not confirm this view. Railton and others have stated that nitroglycerol when treated with alcoholic potash yields glycerol and potassium nitrate. This statement is quite incorrect; the decomposition is of a complex nature. No glycerol is obtained, as it is oxidised at the expense of the NO_3 groups, about two-thirds of which suffer reduction to the nitrous condition, only about one-third being found as nitrate at the end of the reaction. The other products of the reaction are potassium acetate, oxalate, and formate, a small amount of ammonia, and a reddish-brown resinous substance, which gives a dark color to the liquid. Numerous determinations of the amount of nitrite formed showed that 100 parts of nitroglycerol gave from 34·14 to 35·24 parts of nitrous anhydride. (If two-thirds of the nitrogen were converted into nitrous anhydride the amount would be 33·48.) As it was also found that 5 mols. of potash were required to decompose 1 mol. of nitroglycerol, it seems that the principal reaction may be expressed by the equation $C_3H_5(O{\cdot}NO_2)_3 + 5KOH = KNO_3 + 2KNO_2 + CH_3{\cdot}COOK + H.COOK + 3H_2O$. The reaction is the same either with alcoholic or aqueous potash, but is very slow in the latter case, owing to the sparing solubility of nitroglycerol in water.

Ammonia and alkaline carbonates act in a manner similar to potash. The same may be said for sodium hydrogen phosphate, but the reaction is much less powerful, whilst sodium chloride exerts hardly any action. Hydrochloric acid acts less powerfully than alkaline carbonates, and sulphuric acid (1 : 10) less powerfully still, whilst the concentrated acid has no action. De Vrij's statement that nitroglycerol is decomposed by sulphuretted hydrogen, is not correct. The alkaline sulphides decompose nitroglycerol, sulphur being precipitated, and the reaction is rapid, and seems to be promoted by the sulphur, yet the particular part played by that element has not been ascertained. Hot water decomposes nitroglycerol slowly. The amount of nitroglycerol formed from a given weight of glycerol agrees fairly with the assumption of its being glyceryl trinitrate.

As different statements have been made as to the physical characters of nitroglycerol, the author has prepared it in a state of purity, and finds that it is perfectly colorless, and remains so even when exposed to air. It keeps equally well in water or alcohol. Heated on the water-bath no change occurs, unless acids or alkalis are present.

1 gram of nitroglycerol dissolves in 800 c.c. water; in 3 c.c. alcohol; in 10·5 c.c. alcohol (sp. gr. 0·846); in 1 c.c. methyl alcohol (sp. gr. 0·814; in 4 c.c. methylated spirit (sp. gr. 0·830); in 18 c.c. amyl alcohol; in less than 1 c.c. benzine; in 120 c.c. carbon bisulphide; in all proportions in ether, chloroform, glacial acetic acid, and phenol; and sparingly in glycerol.

Nitroglycerol can be estimated with tolerable accuracy by determining the amount of nitrate formed by boiling with alcoholic potash, and assuming that 100 parts of nitroglycerol yield 33·48 parts of nitrous anhydride.—*Jour. Chem. Soc.*, 1885, p. 742; *Trans. Roy. Soc., Edinb.*, vol. 32.

ACTION OF PYROGALLOL ON COPPER AND IRON SALTS.

By P. Cazeneuve and G. Linossier.

When solutions of pyrogallol and ferrous sulphate are mixed in complete absence of oxygen, no change is apparent, but the introduction of a small quantity of oxygen brings about the formation of the well-known blue coloration. If, however, the pyrogallol solution is not fresh, but has been slightly oxidised, the blue coloration is produced at once. The oxygen combines simply with the pyrogallol, and does not oxidise the ferrous sulphate, since ferric salts cannot exist in presence of pyrogallol, but are instantly reduced. A mixture of a ferric salt with excess of pyrogallol gives no coloration with thiocyanates, and no precipitate with ammonium succinate.

When solutions of pyrogallol and ferric chloride are mixed out of contact with oxygen, a fugitive blue coloration is also produced, but almost instantly changes to a deep reddish-brown coloration. Addition of an alkali causes the reappearance of the blue color, and if added in excess changes it to violet. In this reaction, the ferric chloride is reduced, and the ferrous salt combines with the pyrogallol, but the blue compound is at once decomposed by the hydrochloric acid which has been liberated in the process of reduction.

The dark brown color is simply due to oxidised pyrogallol. The addition of alkali neutralizes the free acid, and thus renders the formation of the blue compound possible. All strong acids prevent the formation of this compound, but feebler acids, such as boric and acetic, have not the same effect. The blue coloration is due to the combination of partially-oxidised pyrogallol with a ferrous salt. If a current of air is blown through the blue liquid, or if pyrogallol is mixed with a large excess of ferric chloride and an alkali then added, a black precipitate is formed by the oxidation of the blue compound.

Pyrogallol does not give any coloration with ammoniacal cuprous chloride out of contact with oxygen, but the introduction of a trace of this gas causes the formation of a deep brownish-black compound. Cupric sulphate is immediately reduced by pyrogallol, and on addition of an alkali a black coloration is produced which is changed to red by excess of ammonia, and is destroyed by hydrochloric acid. Cupric acetate gives an immediate black coloration without addition of an alkali. It is evident, therefore, that the action of pyrogallol on copper salts is strictly analogous to its action on iron salts.—*Jour. Chem. Soc.*, 1885, p. 1059; *Compt. rend.* ci.

Mercury Compounds in the Animal Organism. Dr. Richard Fleischer, in a study of the modification undergone by preparations of mercury in the animal economy, adduces the following facts as the results of his experiments:—(1) Calomel, which in pure water is insoluble, in the presence of chloride of sodium is dissolved and transformed into the bichloride of mercury. (2) The formation of mercuric chloride is favored by a high temperature—*i. e.*, the temperature of the body. (3) The amount of mercuric chloride produced is minute, but plainly recognizable. (4) Dilute hydrochloric acid of a strength of 25 per cent. converts only a minimum portion of calomel into the bichloride. A solution of a strength of 4 per cent. is much more active. (5) By mixture of potassium iodide and calomel, iodide of mercury is produced. The double salt produced is soluble in excess of potassium iodide, but separates in pure water into the insoluble oxide of mercury and into iodide of potassium. (6) The oxide of mercury forms with chloride of sodium, corrosive sublimate and caustic soda.—*Deutsche Med. Wochenschrift*, Sept. 3, 1885; *Med. Chron.*, Dec., 1885, p. 229.

CASEÏN IN MILK, AND ON THE ACTION OF RENNET.

By W. Eugling.

The addition of ammonium oxalate to milk does not precipitate the calcium salts, but if, after the addition of the oxalate, calcium chloride be added, then caseïn is separated and carries calcium oxalate down with it; it is considered that calcium is in a definite organic combination with caseïn, and this combination must first be destroyed before calcium can be separated as oxalate. The calcium albuminates in milk resemble basic salts, and are readily decomposed by acetic, lactic, and tartaric acids, but not by benzoïc acid, etc. When acetic acid has been added and then ammonium oxalate, calcium oxalate may be recognized by the microscope, although the quantity of acid has been insufficient to coagulate the milk. Mineral acids, except boric and arsenious acids, act like strong organic acids; at the same time as calcium is in combination with caseïn as a basic salt, phosphates are carried down with the coagulum. Schreiner has stated that when milk is boiled, sulphuretted hydrogen is evolved, but Eugling is unable to corroborate that statement, as he has found the percentage of sulphur before and after boiling to be the same, although various samples of milk differ in their percentage of sulphur; the change which the author believes to occur on boiling is that a part of the phosphates dissolved by the alkaline phosphates of the serum pass by the action of heat out of the serum and combine with the caseïn compounds, the result being the formation of an alkaline albuminate; consequently the milk has an alkaline reaction. This statement is supported by the results of the analysis of milk (fresh and boiled) after addition of alcohol, which separates caseïn, combined with a larger quantity of calcium if the milk has been boiled than when it is fresh. It is because of this rearrangement of the constituents of milk after boiling, that it becomes alkaline, and that rennet has no action on boiled milk; but if an acid be added so as to bring back the original condition by destroying the alkaline albuminate, the rennet produces its well-known effects. It is possible that the action of rennet is to hydrolise a part of the milk albuminates, whereby its combinations with calcium phosphates are rendered less stable; in proof of this, it is stated that although calcium is not recognisable by means of ammonium oxalate in the serum produced by the addition of alcohol or sodium chloride,

yet it is immediately precipitated in the serum from rennet, and as this serum has an acid reaction, it follows that an albuminate has been formed which holds the calcium phosphate in solution as an acid albuminate. Soxhlet considers that the separation of caseïn is accompanied by the formation of lactic acid; the author has been unable to detect this acid in the whey, but he has found several albuminoïds, and prefers to consider the formation of acid albuminate by hydration as most probable.

If milk contains lactic acid (1 per 1000), the action of the rennet is more rapid, but the caseïn produced contains a smaller percentage of ash than it should normally, and is of a bitter taste; if the quantity of acid is more than $1\frac{1}{2}$ per 1000, then the cheese is uneatable. In a cheese prepared under normal conditions, there is present 8·25–8·75 calcium compounds, which are present in the proportion of 1 mol. tricalcium to 1 mol. monohydrocalcium phosphate. Sometimes part of the calcium is replaced by magnesium.—*Jour. Chem. Soc.*, 1885, p. 1083; *Land. Vers.-Stat.*, 1885, p. 392.

Ptomaines.—By F. Coppola (*Gazzetta*, xiv, 571–572)—In a former memoir on the ptomaines the author has pointed out the probability that their genesis is due to the processes, such as Dragendorff's, used for their extraction; a description is given of experiments on the putrefaction of large quantities of various tissues and organs, such as muscle, pancreas, spleen, brain of dog, etc., kept from free access of air, and at the ordinary temperature. For a fortnight the putrefying mass had an acid, but at the end of six weeks a decidedly alkaline reaction. Both the liquid and the solid portions of the resultant mass were extracted with benzene. The extract, on evaporation, gave an abundant yellow residue, which showed all the characteristic reactions of alkaloids. From this result it is inferred that the process of putrefaction is not capable of producing ptomaines, but that the acid reaction conduces to the decomposition of lecithins with generation of a substance having the properties of an alkaloid.

The relatively small quantity obtained from more than 2 kilos. of putrefying material seems further to indicate that the alkaloids extracted by the Dragendorff and Stas-Otto methods are mainly formed by the processes employed for their extraction.—*Jour. Chem. Soc.*, 1885, p. 913.

PHARMACEUTICAL STUDY.[1]

By T. Redwood, Ph.D.,

Emeritus Professor of Chemistry and Pharmacy to the Pharmaceutical Society of Great Britain.

When asked to address a meeting of the School of Pharmacy Students' Association, I was glad to avail myself of the opportunity of showing that, although in an altered position, I am still among you and anxious to contribute to the furtherance of your objects here as students.

I wish to be considered now as one of yourselves—as a student among those of the same class, but differing in this, that I am an old student, very much older than most of you. My studies have been extended over a long course of years, exceeding the period at which men are usually actuated by much enthusiasm or capable of much hard work, but which may possibly have brought, together with somewhat exhausted powers, enlarged experience and an aptitude for sober reflection. You, on the other hand, are on the threshold of an intended career, and in the full possession of active energies, which, if rightly directed, may enable you to attain to any reasonable, just and proper objects of your ambition. Such being our respective positions, we may perhaps confer together with advantage on some matters interesting to us all, and of great importance to you—matters affecting your future welfare and that of the school in which you are studying.

I assume that your intended career is that of the practice of pharmacy, and that you are here for the purpose of studying in those departments of knowledge, appertaining to that career, in which instruction is given in this institution.

The subjects set before you, and of which you are expected to acquire, first an elementary, but ultimately a more advanced, knowledge, are not such as need greatly alarm a student, and yet it may be said of them that their successful study requires the persistent application of the best energies of an active, trained and intelligent mind.

The subjects are botany and materia medica, chemistry and pharmacy, and they are commonly coupled in that order, which suggests the inquiry, Why are they so associated, and in what way are they connected?

Of the four subjects named two belong to the class of sciences, and the other two are not entitled to that distinction. Materia medica and pharmacy are merely departments of art appertaining to the selection and preparation of medicines.

In early remote ages the practice of medicine involved the use of a materia medica, mostly derived from the vegetable kingdom, in the collection of which no scientific knowledge was applied. There were also at that time and long afterwards a good many animal substances employed in medicine, but as scientific knowledge was brought to bear upon the study of medicine, most of the crude abominations of that description were expelled.

1 Address delivered to the School of Pharmacy Students' Association, Nov. 12. We make room for this excellent address, which, in most respects, applies also to pharmaceutical study in the United States. In July last, the veteran Professor Redwood retired from the chair of chemistry and pharmacy, after an active service of more than forty years as a teacher, he having been appointed Professor of Pharmacy in 1842. On the retirement of Mr. Fownes from the chair of chemistry, in 1846, the two chairs were united. On retiring from active service as a teacher, Mr. Redwood was deservedly honored by being appointed Emeritus Professor of Chemistry and Pharmacy. A former pupil of his, Mr. Wyndham R. Dunstan, succeeds him as professor.—*Editor Amer. Jour. Phar.*

The pharmacy also of those days consisted, for the most part, of a rude system of concoction and admixture of vegetable and other substances, with now and then the introduction of a few chemical products, and the application of what was then called chemistry for the improvement of processes. But it was long before the value of chemical compounds in medicine was recognized, and a hot contest prevailed for some time between those who advocated their use and the advocates for the exclusive use of galenical preparations. Ultimately, however, the use of mineral medicines and compounds of definite chemical constitution became established, and those engaged in their preparation and sale assumed the name of chemist and druggist. Previously this class had grown from grocers or dealers in spices into drug-grocers or druggists, most of whom still merely dealt in the raw materia medica, while first (but at an earlier period) the physician, and afterwards the apothecary (half physician and half druggist), prepared the crude drugs for use in medicine. The vegetable materia medica, being subsequently enriched by selections and additions, and further improved by the exclusion of much that was comparatively worthless, acquired increased importance, and some amount of botanical knowledge became necessary for the identification of valuable medicinal plants and their products. Botany thus became an adjunct to materia medica, and its cultivation and study in connection with the latter added a charm to an otherwise dry and comparatively uninteresting subject. As the knowledge and importance of materia medica extended, a more intimate acquaintance with the structure of the various parts of plants, of their organs and of the functions of these, was looked for in those who were considered proficient in the knowledge of the vegetable materia medica. The botanical knowledge required in this study is partly general, that is structural, having a general application to the vegetable kingdom; and it is partly systematic, or special, in as far as it is applied alone to medicinal plants and such as are allied to them. Taken in that sense, however, even if we attempted to confine ourselves within such a limit, the subject altogether would be a tolerably comprehensive one; but we cannot place any such limit to the study of botany even for pharmaceutical purposes. We must study it as a whole, although it may be chiefly with a special application.

There is much that tends to reconcile students to the study of botany. It is the study of some of the most beautiful objects of nature, which although in the ordinary sense mute, possess an eloquence of their own, and never fail to appeal to the hearts of those who are willing to hold converse with them. They are organized beings like ourselves, and of all created beings they are, perhaps, those which offer the greatest facilities for deep searching investigation into the mysterious development of special organisms springing either from an ingrafted type, or from a minute spark of vitality which may have lain dormant for years in an apparently inactive seed. There are some hundreds of thousands of forms of vegetation proceeding from such obscure sources, each having distinct and definite characters of its own, which it is capable of further propagating and thus maintaining a life everlasting. The root, the stem, the branches, the leaves, the flowers, the fruit, the seed. Consider the arrangements of all these parts; how extremely elaborate and sometimes fantastic they are. Such arrangements are apparently infinite, but they are all subject to a law of nature, namely, that of symmetry, which is one of the elements of beauty.

Among the inducements to pursue the examination and study of the elemen-

tary structure and arrangements of parts in the vegetable kingdom is this, that we have tangible objects to deal with here, which can be brought within the cognizance of our senses. We can dissect, divide and subdivide them, and when we have thus passed to the limit of observation by the unaided organs of vision, we can resort to the powers of the microscope and thus open out extended fields for further investigation. The knowledge we thus acquire is of a definite and definable nature. There is nothing speculative about it. It partakes not of the abstract, but of the concrete character.

Botany has become a necessary adjunct to materia medica, and the two subjects are more or less intimately associated when studied for medical or pharmaceutical purposes.

Chemistry, in like manner, has become an adjunct to pharmacy, and, also, although in a lesser degree, to materia medica. As the use of substances of a definite chemical nature has become fully established in medical practice, and the number of medicines of that description has undergone, and is further likely to undergo, considerable augmentation, chemistry is even more necessarily allied to pharmacy than botany is to materia medica. The study of chemistry forms the most important part of pharmaceutical education, and one which admits of great and most useful extension. Taken in its fullest signification, the scope of chemistry is more vast and comprehensive than even that of botany, for while the latter comprehends only one of the three kingdoms of nature, chemistry takes cognizance of all three. It treats not of the physical structure, but of the elementary composition of bodies and of all bodies. The range of its comprehensive application extends even beyond the earth and its surrounding atmosphere. Every material object is composed of parts having a chemical constitution, and this is subject to chemical change. It is the province of the chemist to investigate such changes, and to trace out the component parts of all objects, but we cannot do this in the way in which we trace out the structure and arrangement of parts of a plant. We cannot say of the matter of which chemistry treats that it consists of parts, or atoms, or molecules that are tangible, visible, or definable as to structure. We may know them in the aggregate, but of the individual parts our knowledge is indefinite and speculative. What do we know of any chemical element or compound? Of oxygen, or water, or alcohol, for instance? We know oxygen as a gas, and may acquire some knowledge of it in a more condensed form, but what do we know of its ultimate particles or atoms, of their form, size, or weight? So also with regard to water, a chemical compound of ogygen with another element, or alcohol or acetic acid, compounds of oxygen with two other elements. We have a certain concrete knowledge of them; we know them in the aggregate, but beyond that we enter the region of speculation. Our knowledge leads us to the conclusion that water is a chemical compound of oxygen and hydrogen. But what do we mean by a chemical compound of elements? It does not simply mean that the elements are brought together, intimately mixed, and in contact. We may to that extent put oxygen and hydrogen together in the definite proportions in which they combine, but that does not necessarily involve combination; and when they are combined what is the nature of their altered condition, and what are the positions and distribution of the respective atoms or particles? We are accustomed to represent the elements by symbols, and to represent chemical compounds by placing the symbols in juxtaposition, or by connecting them in

some way by lines. These graphic representations are often complex, and may sometimes appear as fantastic, although certainly not so beautiful as the visible arrangement of parts in a flower or plant. But the visible arrangement of parts in the one case and the graphic representation in the other, have quite different meanings. Graphic representation in chemistry is a result of comparatively modern science culture. It fulfils some useful objects, but to the imperfectly instructed student it is liable to induce erroneous conceptions, which have to be carefully guarded against.

It is one of the objects of modern chemistry to study the possible aggregations of atoms in chemical compounds, and the changes to which these may be subject, such study being conducted not merely on the basis of our concrete knowledge, but in accordance with certain abstract principles and conceptions. For many years past chemistry has been gradually becoming more of an abstract, if not less of a concrete science. Twenty years ago Sir Benjamin Brodie, Professor of Chemistry in the University of Oxford, proposed a special application of the science of algebra for expressing by means of symbols, and without reference to any hypothesis as to the nature of the material world, all the facts of chemical changes. This method he called "the calculus of chemical operations." The proposal then received but slight encouragement, arising, perhaps, partly from the circumstance that the abstract principles of chemical science had, as indeed they still have, not been sufficiently developed and established to justify the application of such a method of treating chemical data. Obviously, however, there is a tendency in that direction, and it is useless for those who wish to pursue the study of chemistry with the view of keeping pace with modern advancement in the science to shut their eyes to the present requirements and tendency of the study.

Chemistry and botany are two fundamental subjects, a more or less advanced knowledge of which is necessarily comprised in the education and qualification of pharmaceutical chemists, and it is an important question for the student to consider how much of his time should be devoted to the systematic study of these departments of science, and what portion to other branches of technical knowledge?

Pharmaceutical students, from necessity often, and more frequently from necessity than choice, have to limit the time they can devote to systematic scientific studies. This was more especially apparent at and soon after the time at which examinations were rendered compulsory. The pressure brought to bear upon our students and schools from that cause led to the adoption of short courses of instruction in this and other schools. Previously, also, from other causes, courses which had been separate became united, and the time given to each subject was thus considerably curtailed. Thus chemistry and pharmacy, which were formerly separate courses, [2]were united, as also were botany and materia medica. I look upon this as a result which has been justified only by necessity, and for which we may hope to find a remedy in the future. My experience is to the effect that since the first great influx of students, which took place after the passing of the Pharmacy Act of 1868, and especially during recent years, there has been an increased proportion of students who have been willing and anxious to extend their scientific studies. There is ample scope, and, in my opinion, urgent requirement for such extension. Let it not be sup-

[2] In the American Colleges of Pharmacy, these two branches form separate courses.—*Editor.*

posed that the usual association of botany with materia medica, and of chemistry with pharmacy, is a valid excuse for limiting the study of either of those sciences to what is required in the practice of pharmacy. Such a limitation would indicate a very low estimate of the value of scientific studies as means for advancing mental culture and qualifying a man to occupy a worthy position in the ranks of professional pharmacists. Practically, such a limitation cannot be carried out with any good effect. The knowledge so limited is imperfect; it is soon lost, and it thus fails to impart a permanent character upon those who have acquired it.

The botanist, if he be such, will seek acquaintance, by recognition or investigation, with every flower or plant that comes under his observation, and finds in this a constant source of pleasure, and the only means of keeping up his botanical knowedge.

The chemist, also, will desire to follow the progress of discoveries in his department of science, and in doing so will find new investigations and speculations, new facts and theories, ever crowding upon his attention, and claiming a record in his memory. If, having commenced the study of chemistry for a special purpose, he rests satisfied with the modicum of knowledge he has acquired in his pupilage, or that which he requires in his daily occupation, he will soon cease to be otherwise a chemist than possibly in his own imagination or by the appellation he has adopted. Should he hope to keep pace with the progress of chemical science, he must lay a broad and solid foundation for it, must acquire a love of scientific study and research, and, holding his theoretical views somewhat loosely, be prepared to relinquish doctrines long cherished as landmarks, when new facts, proved to be such, are found to militate against them.

One of the objects I have had in view in this address has been to advocate an extension of the study of chemistry and botany by pharmaceutical students, and to show that all improvements in pharmacy as a professional art have sprung in the past, and can only be looked for in the future from that source.

The School of Pharmacy Students' Association seems to me to be a fitting arena for the discussion of topics such as I have touched upon, and especially for the consideration of the feasibility and desirability, in regard to lecture arrangements, of seeking a divorce of the alliances between chemistry and pharmacy, botany and materia medica, as well as an extension of the time allotted to the subjects of chemistry and botany.

It may be a question how far, or whether, an extension of the application of botanical knowledge in the study of materia medica would be capable of replacing other parts of the study of that subject as hitherto pursued, but with reference to the application of chemical knowledge to the art of pharmacy, there can, I think, be no doubt that it is destined to replace much of what has hitherto constituted the chief art involved in the production of galenical preparations. Such preparations must sooner or later assume more of a definite chemical character, and ultimately be classed among chemical products.

I am not prepared to advocate the relinquishment of class instruction in purely pharmaceutical operations, although I think the proper places for the acquirement of such knowledge are the pharmaceutical establishments in which they are practically conducted.

To the extent to which there is a demand for such instruction, it should be provided in our schools, together with instruction in dispensing, but it is to be

sincerely hoped that the requirement for this provision will gradually tend towards, although it may be long in reaching, a vanishing point.—*Phar. Jour and Trans., Nov* 21, 1885.

MINUTES OF PHILADELPHIA COLLEGE OF PHARMACY.

PHILADELPHIA, December 28th, 1885.

A stated meeting of the members of the Philadelphia College of Pharmacy was held this day, at 3.30 P. M., in the hall of the college. Twelve members present. The minutes of the previous meeting were read and adopted. The minutes of the Board of Trustees for the meetings of October, November, and December were also read and approved.

Professor Maisch stated his desire to have placed upon record in the minutes of the college an expression of the appreciation, and estimation placed by the college upon the generous gift of Mr. R. Rother, of Detroit—now known, and disbursed as the "Rother Fund"—a contribution of five hundred dollars made to this college, for scientific purposes,—for the aid and encouragement of original analytical research. It was further stated, by Professors Sadtler and Trimble, that a large portion of this fund had already been expended, with the approval of Mr. Rother, in the purchase of apparatus of the best mechanical construction for the purposes designed, and also of material for use in the investigations.

A communication was read by the Secretary from John W. Geiger, Secretary of the Maryland College of Pharmacy, soliciting information in regard to the practice of this college towards students, who, failing in final examination, elect to pursue subsequent courses. On motion of Professor Maisch the subject contained in this communication was referred to the Board of Trustees for consideration.

Professor Maisch referred to the recent death of Prof. Edw. S. Wayne, formerly of Cincinnati, an associate member of this college, whose contributions to the literature of pharmacy, and whose investigations are well known and recognized.

Some remarks were offered by Mr. Thompson and supplemented by a resolution to appoint a committee to examine and report upon the present plan of preliminary examination, which elicited reply and discussion, but terminated in the defeat of the resolution. Mr. Thompson expressed the view that a subject so important did not appear to receive the general interest it demanded from members of the college, and that the drift, as well as tendency, seemed to be to relapse into the errors and defects of previously existing methods, and to lose the advantages sought in instituting a preliminary examination. Mr. Blair spoke at length on the subject, accepting these views, but also deprecating the fact that the diploma of the college had lost its value, owing to indifference to certain necessary requirements, as a certificate of competency, and that sufficient efforts were not made to verify, or substantiate the statements made by candidates for graduation as to their required terms of shop-service, or tuition. Professor Maisch expressed the conviction that this statement reflected upon him as dean of the faculty, and said that he made it an especial

duty to satisfy himself as far as it were possible, under the circumstances, and conditions imposed, that all statements were correct in fact and in truth, that he performed this duty conscientiously, and to the best of his ability.

Professor Sadtler expressed a disposition to do all that was compatible with duty and propriety in regard to this question. The present plan he would not condemn, nor would he wholly approve until it had been demonstrated by experience and observation that it was either defective or efficient as a means to the ultimate end sought. He further thought that the time had hardly arrived as yet, either to modify the present plan or determine upon another.

No other subject being presented for consideration, the meeting, on motion, adjourned. WILLIAM B. THOMPSON, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 15, 1885.

The meeting was called to order by the actuary, who nominated Mr. Robert England as chairman.

The minutes of the last meeting were read, and, there being no objections, they stand approved.

The "History of Twenty Years in Congress," by Hon. James G. Blaine, was presented to the library by the publishing committee, and was ordered to be placed in the library.

Mr. Holberg, a member of the present senior class, read a paper on *sodium chlorate;* the paper was accepted and referred to the committee on publication.

Mr. Lowe asked if any of the students could state whether they had found the cabinets of botanical drugs were of value to them in prosecuting their studies; he said that such an examination as he had been able to make impressed him favorably.

Prof. Maisch exhibited a growing specimen of *Urginea Scilla,* the true squill, received from Mr. George I. McKelway for the cabinet of the college. Prof. Maisch stated that very often bulbs are offered by dealers as squills which do not belong to the genus Scilla, but to the nearly allied genus Ornithogalum. These green bulbs appear to be mainly mucilaginous, and not acrid, like true squill. A vote of thanks was tendered to Mr. McKelway for the handsome specimen.

Mr. H. S. Barr, an old member of the drug trade, exhibited a *bell-metal mortar,* bearing date of 1635, and which showed evidence of having given frequent practice to what was formerly an elementary part of a druggist's education.

Prof. Remington exhibited a specimen of *urethane,* a new hypnotic, claimed to be devoid of the usual unpleasant after-effects that attend the use of most remedies of its class. It has been largely experimented with in the hospitals of Europe. Its usual dose is half a gram to one gram or more. The compound crystallizes in large tables, melts near the boiling-point of water, is sublimable, dissolves readily in water, alcohol and ether, and being almost tasteless, may be given in the form of solution or powder.

Another new remedy, *pyridine,* was also exhibited, and it is stated that the peculiar soothing influence induced by the smoking of tobacco is due to this principle. In response to a question as to the cost of these substances, Prof. Remington stated that urethane was worth about two dollars the ounce, but that should the demand warrant its large manufacture, it would doubtless be furnished at a very much lower price.

Mr. Lowe referred to the statement that *iodol* (see *Am. Jour. Phar.*, 1885, p. 605) containing 94 per cent. of iodine, had been used for the same or similar purposes as iodoform, and had the advantage of being free from the unpleasant odor which almost prevented the use of the latter in private practice. This gave rise to a discussion upon the best means of disguising the odor of *iodoform;* among other methods, the use of extract of vanilla, thymol, oil of bitter almonds and oil of verbena were recommended; but it was generally agreed that none were entirely efficient for the purpose. Prof. Maisch stated that thymol had been mentioned as an adulterant of *menthol*, and referred to recent investigations made by Prof. Flückiger, showing that the two crystalline substances left in contact, become liquid. Older observations had shown an analogous behavior between camphor, chloral and phenol. These facts rendered it desirable that the experiments be extended to other stearoptens.

There being no further business, a motion to adjourn was carried.

T. S. Wiegand, *Registrar.*

EDITORIAL DEPARTMENT.

The Fifty-eighth Volume of this Journal commences with the present issue. Great, indeed, are the changes which have taken place in pharmacy since the Journal first made its appearance as a regular periodical in 1829. As an applied science, pharmacy must follow in the wake of those sciences upon which it mainly relies, namely, botany and chemistry, in both of which—but more particularly in the latter—unusual activity has prevailed for many years, resulting in making more or less permanent impress upon the scope, as did the progress in mechanical and physical science upon manipulative pharmacy. Education has been extended, not merely by the increase of the number of educational institutions, but, what is of greater importance, by the enlargement of the curriculum and by the offering of laboratory facilities. Pharmaceutical societies have been organized, laws enacted for the regulation of the practice of pharmacy, and the literature pertaining to pharmacy has been greatly increased.

As an accurate record of these and kindred changes, and of other facts pertaining to pharmacy, the Journal extends over more than half a century; and it enters upon its new volume with the aim of making the record at least equally full and reliable in the future. That further great changes must be expected is obvious from the continued advances made by the fundamental sciences; but to what these will ultimately lead cannot with any degree of certainty be foretold. Faithful to its purpose, the Journal will continue its devotion to the advancement of pharmaceutical knowledge—scientific as well as practical—and of pharmaceutical education, and pharmaceutical literature in general will receive due attention. To the generous contributors and correspondents, who in the past have aided his labors, the editor returns his grateful acknowledgements and bespeaks a continuance of their valued interest in the Journal, and in its aims and objects, an interest which he sincerely hopes may also be shared by numerous other friends who have a warm feeling for the progress of pharmacy, but who, from some cause or other, have hitherto been unable to put in writing their investigations and observations on practical or scientific pharmaceutical subjects, whether made in the laboratory or behind the prescription counter.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Practice of Pharmacy. A treatise on the modes of making and dispensing officinal, unofficinal and extemporaneous preparations, with descriptions of their properties, uses and doses; intended as a hand-book for pharmacists and physicians and a text-book for students. By Joseph P. Remington, Ph. G., Professor of Theory and Practice of Pharmacy, and Director of the Pharmaceutical Laboratory in the Philadelphia College of Pharmacy, etc. With nearly 500 illustrations. Philadelphia: J. B. Lippincott Company, 1885. 8vo, pp. 1080. Price $5.00

By the appearance of this work, near the close of the past year, a book has become accessible to the pharmacist and pharmaceutical student which will prove of very great value to them. Its general arrangement and classification, the judicious distinction made between important and unimportant matters, the correctness of statements, the clearness of diction and the numerous useful illustrations, will at once secure for it deserved commendation.

The introductory portion is devoted to the explanation of the arrangement and scope of pharmacopœias and dispensatories. Then follows Part I. of the work proper, in which, upon about 200 pages, the physical operations of the various pharmaceutical processes are considered, together with the apparatus required therefor. Weights and measures, the operations requiring heat, comminution, filtration, precipitation, crystallization, dialysis, maceration, expression, percolation, etc., are thus brought into view and discussed theoretically and in their general practical application.

The next 150 pages comprise Part II., the officinal liquid pharmaceutical preparations, such as solutions of different kinds, liniments, infusions, decoctions, tinctures, fluid extracts, oleoresins and vinegars, and of the solid preparations, the extracts, abstracts and resins.

The two parts following treat of the chemical medicinal compounds and products, Part III. being devoted to the inorganic substances (150 pages) and Part IV. to organic substances (230 pages). The former are arranged in the main in a manner similar to that usually found in chemical text-books. For the grouping together of the latter a system has been adopted which is based upon the chemical character of the substance or of the principal constituents of the drugs, and either in connection therewith or subsequently considers the derivatives. While in Part III. we thus have the non-metallic elements, followed by the alkalies, alkaline earths and the various heavier metals. Part IV. considers first the carbohydrates with their derivatives obtained by chemical action, fermentation and destructive distillation, then the volatile oils, resins and allied products, fats and soaps, glucosides and neutral principles, alkaloids and animal substances; this part closes with a chapter on pharmaceutical testing.

Part V., on extemporaneous pharmacy, occupies 220 pages and treats of dispensing prescriptions, solutions, mixtures, powders, troches, pills, suppositories and cerates and allied preparations for external use.

The work closes with Part VI., which contains upon 32 pages a formulary of well selected unofficinal preparations, and is followed by a very full index covering 38 pages.

That the work on its first appearance has become so voluminous, we think,

will be regretted. This is altogether due to the verbatim reproduction of the pharmacopœial processes for galenical and chemical preparations, in many cases even taken from the former Pharmacopœia. The scope of the work can be scarcely intended for its use as a manual in the laboratory, and the utility of the verbatim quotations may therefore be fairly questioned; but if thus intended, why should not all officinal and the important unofficinal preparations be treated alike? To illustrate: for preparing Ferri sulphas the formula of the *British Pharmacopœia* is given in full, while for Ferri valerianas only the outlines of the process are given, which is ample for the intelligent pharmacist, particularly if precautions to be observed are pointed out. The former salt being largely used in the arts, may be procured in commerce much cheaper than it can be made by the pharmacist, unless obtained as a secondary product; the second salt, however, may be advantageously prepared by the pharmacist. When requiring corrosive sublimate, calomel, etc., the pharmacist will purchase such salts, and confine himself to testing their purity; a working formula, therefore, does not appear to be any more necessary for these salts than for instance, for copper sulphate, where the bare outlines have been deemed sufficient. An oversight occurs in connection with the latter (p. 596) which is said to be made by acting on scrap copper with *diluted* sulphuric acid.

While we think that the work could be improved in the direction indicated above, it will be observed that our preference lies in the direction of seeking in a work like the one before us, a great deal *less* than is given in the formulas alluded to.

To sum up our review, we will have to conclude as we commenced, that the book is a very valuable one, and that all its essential features will meet with deserved commendation; and we may add that it deserves to be in the hands of every pharmaceutical student and of every one who takes an interest in pharmacy. That the mechanical getting-up of the work is excellent, needs scarcely being mentioned.

The Pharmacist, published by the Chicago College of Pharmacy, announces in its December number, which completes the 19th volume, that its career terminates with that issue, and that it will be consolidated with the *Western Druggist*. The latter is one of the best and most enterprising pharmaceutical trade journals; and while we heartily congratulate it on this "absorption," we cannot help to express our regret that this sign of prosperity puts an end to a kindred journal which in its earlier history and at various times since, has diligently labored for progressive pharmacy.

An Ephemeris of Materia Medica, &c., the publication of which was commenced in January, 1882, has come to a close with the twelfth number of Vol. II, bearing date of November, 1885. Dr. E. R. Squibb, who wrote most of the articles contained in the two volumes, has gone abroad on a tour of recreation and inspection, a prominent object of his journey being to ascertain the sources of the best qualities of the commercial articles of the materia medica. While regretting the—we may hope temporary—abandonment of the publication of serial pamphlets containing so much information of value, those who know Dr. Squibb will agree that the recreation now taken has been well earned by a long period of labor and usefulness.

OBITUARY.

Professor Edward S. Wayne died in Philadelphia, December 11, 1885, aged sixty-seven years. He learned the drug business with Frederick Klett, whose well-known store was located at Second and Callowhill Streets, Philadelphia. The apprenticeship commenced in 1835, when Mr. Wayne was in his seventeenth year, and ten years later he entered into partnership with a nephew of Mr. Klett, Mr. Samuel Pleis, forming the firm of Wayne & Pleis, at Cincinnati. Subsequently, Mr. Wayne was in charge of the prescription department or of the laboratory of several Cincinnati houses, like A. Zeller & Co., F. E. Suire & Co., and J. S. Burdsill & Co.

The organization of the Cincinnati College of Pharmacy was furthered in every way by Mr. Wayne, whose reputation and skill as a pharmacist and chemist caused him to be made one of its professors, and it was particularly in the chair of materia medica, that his labors met with signal success. Being a fluent and pleasant speaker, his lectures were made particularly interesting through his long and successful laboratory experience.

In 1852, the Cincinnati College appointed him a delegate to the convention which was held in Philadelphia, October 6 of that year, and by which the American Pharmaceutical Association was organized. Prof. Wayne was not present then; but in 1854, at the meeting held in Cincinnati, he became a member of the Association and was elected Recording Secretary, serving subsequently also on several committees and as Vice President, and evincing his interest in the Association by presenting, in 1855, the first essay—aside from committee reports—read before this Association; and this was followed in 1856 by five, and in 1867 by six papers from his pen. He published also several papers in the Cincinnati Druggist, and a number of valuable papers were contributed by him to this Journal from 1855 to 1876.

Professor Wayne was a skillful experimenter and manipulator, and a close and careful observer. Years ago, we saw in his cabinet many specimens of interest, procured mostly from indigenous drugs. Want of sufficient leisure prevented him from communicating many of his observations to pharmaceutical literature, and it is doubtful whether this may now be done from the specimens and notes left behind.

Professor Wayne was an associate member of the Philadelphia College of Pharmacy, an honorary member of the British Pharmaceutical Conference, and of other scientific bodies.

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SIXTY-FIFTH ANNUAL SESSION, 1885-1886.

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Wishart, Frederick Gray,	Philada.,	Pa.	F. E. Harrison.
Wolf, Joseph Franklin,	Glassboro,	N. J.	White & Brother.
Wolfersberger, Geo. Wash.,	Campbellstown,	Pa.	Dr. W. C. Kline.
Wright John Armstrong,	Philada.,	Pa.	A. W. Wright & Co.
Wright, Walter,	Moorestown,	N. J.	William Wright.
Wrigley, John Thomas,	Chester,	Pa.	James F. Judd.
Young, Wayland Philips,	Atglen,	Pa.	Dr. W. O. Higgate.
Zane, James Stewart,	Salem,	N. J.	W. Hansell.
Zeller, Albert Theodore,	Rochester,	N. Y.	Fred'k Hertel, M.D.

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Matriculants.	*Town.*	*State.*	*Preceptor.*
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Adams, Ellsworth Smith,	Beverly,	N. J.	E. S. Adams.
Albright, Charles Wesley,	Camden,	N. J.	H. O. Cox, M. D.
Alexander, Everett Vincent,	McConnelsville,	Ohio.	J. Alexander.
Allen, David Roberts,	Paris,	Ky.	J. A. Lyle & Co.
Arnold, Claude Horace,	Clifton Springs,	N. Y.	J. Hinds.
Ashton, Charles Butterworth,	Norristown,	Pa.	Wm. Stahler.
Backes, Thomas Joseph,	Philada.,	Pa.	E. P. Camp.
Baker, David Wiley,	Trenton,	N. J.	I. W. Kelly.
Barlow, Louis Eugene,	Galion,	Ohio.	B. N. Bethel.
Barrowman, William G.,	Scranton,	Pa.	Thos. Barrowman.
Becker, Harry Vane,	Fort Wayne,	Ind.	Meyer Bros. & Co.
Bell, Robert Mathew,	Philada.,	Pa.	C. J. Nice.
Bender, Jr., Wm. Piper,	Camden,	N. J.	J. R. Angney, M. D.
Bernardy, Emile Seraphin,	Philada.,	Pa.	W. T. Baker & Co.
Berret, Arthur,	Philada.,	Pa.	W. A. Musson.
Bickley, Milton Horace,	Chester,	Pa.	M. H. Bickley.
Bicknell, Robert Cooke,	Madisonville,	Tenn.	E. Lehman.
Biddle, Richard,	Philada.,	Pa.	
Birt, Frank John,	Trenton,	N. J.	A. Schwartz.
Bishop, Saml. Walter,	Beverly,	N. J.	H. C. Van Meter.
Bogart, Charles Mount,	South Amboy,	N. J.	G. W. Jacques.
Bonner, Charles Frederick,	Zanesville,	Ohio.	E. E. Hazlett.
Bowman, Lin Light,	Schuylkill Hav'n,	Pa.	E. W. Stazer.
Boyd, John Charles,	Paris,	Ill.	J. B. Addelsberger.
Braddock, Jr., Chas. Shreve,	Haddonfield,	N. J.	I. A. Braddock.
Brandt, Katie H.,	Philada.,	Pa.	
Brecht, Morris Winfield,	Lancaster,	Pa.	F. P. Albright.
Breneiser, Edgar,	Reading,	Pa.	F. E. Himmelwright.
Brown, Albert Edward,	Morris,	Ill.	T. & E. Catlin.
Brown, Frank L.,	Chester,	Pa.	J. M. Stoever.
Brownley, Charles Jackson,	Porstmouth,	Va.	W. G. Day.
Buckley, James Edward,	Tacoma,	W. T.	J. F. Hayes.
Bullock, Wm. Anthony,	Philada.,	Pa.	Bullock & Crenshaw.
Burg, John Dellinger,	York,	Pa.	J. M. West, M. D.
Burk, Alfred Gray,	Flemington,	N. J.	H. P. Lechler.
Burke, Wm. Thompson,	Philada.,	Pa.	A. Kennedy.
Burkhart, Herman Adolphus,	Bethlehem,	Pa.	E. H. Luckenback.
Butts, Simon Mark,	Gettysburg,	Ohio.	L. E. Sayre.
Cafky, Wm. Walter,	Jacksonville,	Ill.	W. E. Lee.
Cahill, Daniel Wm.,	Watertown,	N. Y.	H. J. P. Spencer & Son.
Campbell, Harry Belting,	Bridgetown,	N. J.	Fred. Seitz.
Campbell, Wm. Henry,	Philada.,	Pa.	F. Jacoby, Jr.
Cheney, Walter Bowden,	So. Manchester,	Con.	Cheney & Goulden.
Christ, Charles Wesley,	Selins Grove,	Pa.	J. E. Lehman.
Clark, Robt.,	Philada.,	Pa.	B. Franklin Sholl.
Cohen, Nathan Alexander,	Philada.,	Pa.	G. W. Carpenter & Co.
Cohn, Arthur H.,	Milwaukee,	Wis.	Louis Lotz.
Colborn, Isaiah Grant,	Ashland,	Pa.	W. F. Colborn.
Commings, Charles Samuel,	Schuylkill Hav'n,	Pa.	H. N. Coxe,
Comp, Henry Gerhard,	Mt. Joy,	Pa.	C. H. Clark.
Cowie, Isabella,	Calcutta,	India.	
Craig, Edwin Sherman,	Massillon,	Ohio.	T. M. Johnson.
Creighton, Orville Sharp,	Somerton,	Ohio.	B. F. Creighton.
Dallett, Prosper Martin,	Philada.,	Pa.	Bullock & Crenshaw.
Dansberger George Wm.,	Chambersburg,	Pa.	J. S. Nixon & Son.
Davis, Alfred Ivins.	Pemberton,	N. J.	S. S. Collom.

Matriculants.	*Town.*	*State.*	*Preceptor.*
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Deibert, Thomas Irwin,	Schuylkillhaven,	Pa.	G. W. Kennedy.
DeKalb, Hugh Leonard,	Bustleton,	Pa.	R. W. Hickman.
DeReeves, Eugene,	Trinity,	Tex.	M. Campbell.
Donnell, George J.,	Clifton Heights,	Pa.	G. R. Vernon, M. D.
Donough, Wm. Edgar,	NorthHeidelberg	Pa.	M. A. Davis.
Downes, Clarence Eugene,	Denton,	Md.	T. O. Nock.
Downes, Randolph Hinson,	Templeville,	Md.	F. A. Sanderson.
Drew, Diamer,	Wor hum,	Va.	H. C. Manlove.
Duffie, Silas Johnstone,	Columbia,	S. C.	Dr. C. H. Miot.
Dunn, Frederick,	Philada.,	Pa.	J. M. Rudolph.
Dunn, Walter,	Clifton Heights,	Pa.	A. Tatem.
Eisenhart, Foster Benjamin,	Hellertown,	Pa.	W. F. Owen.
Elden, Wm. McKee,	Bendersville,	Pa.	P. S. Brugh.
Emerson, Henry Everett,	Milford,	Pa.	C. A. Armstrong.
Ennis, George A.,	Wilmington,	Del.	Brown & Tomlinson.
Evans, George Brinton,	Plymouth,	Pa.	James V. Perse.
Fahey, Edward H.,	Wilmington,	Del.	H. K. Watson.
Falloure, Edwin Reed,	Wheeling,	W. Va.	J. B. Reynolds.
Faust, John Kirk,	Reading,	Pa.	J. H. Stein.
Ferguson, James A.,	Philada.,	Pa.	J. B. Ferguson.
Fetter, Harry Herman,	Philada.,	Pa.	Wilson & Bro.
Fetterolf, Daniel Webster,	Ashland,	Pa.	S. A. Marshall.
Fischer, Albert Martin,	Philada.,	Pa.	J. L. Supplee.
Fisher, Frederick Drake,	Wheeling,	W. Va.	C. E. Dwight.
Fisher, Jacob, Livingood,	Pawxsutawney,	Pa.	A. P. Cox, M.D.
Fletcher, Oscar, Conrad,	Franklin,	Ky.	H. Moore.
Flynn, John Joseph,	Mt. Holly,	N. J.	J. H. Hulme.
Fritsch, Harry,	Philada,,	Pa.	W. R. Warner & Co.
Galbraith, Wm. Henry,	Springfield,	Pa.	
Gardner, Frank Edwin,	York,	Pa.	B. F. Johnson.
Giffin, Henry Riggeal,	Philada.,	Pa.	F. E. Morgan.
Goodman, Oscar Peter,	Omaha,	Neb.	C. F. Goodman.
Gould, John R.,	Bellebend,	Pa.	A. B. McCrea.
Graf, Albert Frederick,	Philada.,	Pa.	J. R. Elfreth.
Grant, James Smith,	Frostburg,	Md.	G. A. Wingert.
Greenawalt, Wm. G.,	Chambersburg,	Pa.	C. H. Cressler.
Groom, Elleslie Wallace,	Bristol,	Pa.	Dr. H. Pursell.
Groom, Joseph,	Philada.,	Pa.	Hance Bros. & White.
Hall, Frank Devie,	Newark,	Ohio,	L. E. Sayre.
Hall, Harry Newberry,	Aguas Calentes,	Mexico,	Dr. H. S. Squire.
Harrigan, John William,	Philada.,	Pa.	R. R. Stewart, M.D.
Harrison, Thomas Wesley,	Philada.,	Pa.	W. B. Bicker.
Hartzell, William Lincoln,	Philada.,	Pa.	J. G. Howard.
Hauck, Allen Wesley,	Lebanon,	Pa.	S. C. Blair, M.D.
Hayes, Wm. Nathaniel,	Philada.,	Pa.	J. F. Hayes.
Heim, Henry, Lewis,	Philada.,	Pa.	Aschenbach & Miller.
Heller, Charles Tompkins,	Bridgeton,	N. J.	J. L. Curry.
Henderson, James Rutledge,	Spartansburg,	S. C.	H. E. Heinitsh.
Herring, Doane,	Wilson,	N. C.	W. A. Rumsey.
Herrmann, Ralph Christian,	Allentown,	Pa.	August Weber.
Hettinger, Howard Huyett,	Reading,	Pa.	J. B. Raser.
Hewitt, Charles Ellsworth,	Liberty,	Ind.	C. L. Mitchell, M.D.
Hiecke, William,	Milwaukee,	Wis.	Otto Schorse.
Hiestand, John Summy,	Mt. Joy,	Pa.	D. G. E. Musselman.
High, Edward Gilbert,	Philada.,	Pa.	Hance Bros. & White.
Hinkle, James,	Trenton,	N. J.	S. N. Penrose.
Hinterleitner, Geo. Gustav,	Pottsville,	Pa.	S. R. Miller.
Hoffman, Geo. Wm. Jacoby,	Terre Haute,	Ind.	Gulick & Berry.

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Holland, Edgar Atwood.	Frazer,	Pa.	C. E. Davis.
Hooper, Sidney Lee,	Philada.,	Pa.	Bullock & Crenshaw.
Horner, Kaspar,	San Antonio,	Tex.	L. Orynski.
Hulshizer, John Clayton,	Hughesville,	N. J.	W. J. Shaffer.
Jacobson, Frank Edward,	Bethlehem,	Pa.	Cyrus Jacoby.
Johnson, Frank Elmer,	Morton,	Pa.	H. M. Brennan.
Johnson, Seth Caleb,	Atsion,	N. J.	T. P. Waters, M.D.
Johnstone, Henry Havelock,	New Castle,	N. Brunsw'k.	E. Lee Street.
Jones, Samuel Stephen,	Wilkesbarre,	Pa.	Millard F. Cypher.
Judge, John Aloysius,	Philada.,	Pa.	Bullock & Crenshaw.
Kalteyer, Moritz,	San Antonio,	Tex.	G. H. Kalteyer & Son.
Keck, Frank Peter,	Laurys,	Pa.	Hartzell, Smith & Co.
Keifer, John,	Loudonville,	Ohio.	D. F. Shull & Co.
Kelly, William Daniel,	St. Paul,	Min.	McMaster & Getty.
Keogh, Francis Joseph,	Philada.,	Pa.	J. Howard Evans.
Keyes, Frank Williamson,	York,	Pa.	James L. Bispham.
Kiedaisch, Jr., John Fred'k,	Keokuk,	Iowa,	Wilkinson & Co.
Kieffer, Otto de,	Philada.,	Pa.	James T. Shinn.
Kirkham Walter Agan,	Newark,	N. Y.	M. M. Kenyon.
Kizer, Thomas Joseph, Jr.,	Winchester,	Ind.	D. S. Ferguson.
Klopfenstein, John A.,	Galion,	Ohio,	J. M. Reugenberg.
Knight, Howard,	Edgewood,	Pa.	Wm. Procter Jr. Co.
Knisell, Sidney L.,	Woodbury,	N. J.	Bullock & Crenshaw.
Koch, Charles Herman,	Philada.,	Pa.	J. T. Shinn.
Kroh, Harry H.,	Conshohocken,	Pa.	D. W. Harry.
Kurtz, David Haines,	Blue Rock	Pa.	John B. Raser.
Lache, Oscar Julius,	Philada.,	Pa.	Webb & Gatchell.
Lackey, Richard Henry,	Philada.,	Pa.	Given & Co.
Lafean, Edward Charles,	York,	Pa.	A. H. Lafean.
Lammer, Jr., Francis Joseph,	Philada.,	Pa.	Wyeth & Bro.
Lantz, John Joseph,	Philada.,	Pa.	W. H. Lantz.
Laurence, Samuel Comfort,	Attica,	N. Y.	Dr. E. J. Snitcher.
Leitch, Charles T.,	Appleback,	Pa.	C. W. Clymer & Co.
Lintner, John Rathfon,	Millersville,	Pa.	H. B. Cochran.
Lowenthal, Wm. A.,	Evansville,	Ind.	G. Appenzeller.
Long, John Nathan Grier,	Honeybrook,	Pa.	J. R. Remington.
Longshore, John Liggett,	Mansfield,	Ohio,	P. Bigelow.
Loughead, Raymond Blythe,	Chester,	Pa.	G. B. Wilson.
Loughridge, Samuel Steen,	Philada.,	Pa.	J. N. Higgins.
McBath, Wm. Andrew,	Flenniken,	Tenn.	E. W. Tedford.
McCarthy, Cornelius Joseph,	St. Clair,	Pa.	Bullock & Crenshaw.
McClanahan, John Thomas,	Galveston,	Tex.	C. E. Watson & Co.
McConnell, Charles Henry,	Philada.,	Pa.	D. F. Shull & Co.
McCoy, Clarence Herbert,	Lebanon,	Ill.	W. A. Weldon.
McFarland, Thaddeus H.,	Hudson,	Ohio,	E. S. Bentley.
McKee, Joseph,	Bridgeton,	N. J.	H. T. Seeley.
Mallard, Jeff, Franklin,	Rusk,	Tex.	W. G. Jamison & Co.
Mallon, James Peter,	Philada.,	Pa.	J. M. Fronefield.
Marbourg, J. George,	Bedford,	Pa.	Charles Shivers.
Maurer, George Bright,	Reading,	Pa.	F. X. Wolf.
Mawhinney, Frank,	Ambler,	Pa.	Keasby & Mattison.
Mayo, Caswell Armstrong,	Columbus,	Miss.	James P. Bolton.
Means, Samuel Robert,	Lewistown,	Pa.	D. L. Stackhouse.
Meek, William Henry,	E. Douglass,	Mass.	G. B. Evans.
Medd, Henry,	England.		C. H. Wagener.
Melot, Irvin G.,	Schuylkill Hav'n,	Pa.	John B. Raser.
Miller, Joseph Charles,	Rohrerstown,	Pa.	Charles Bauer.
Moeszinger, Philip Pierre,	Lyons,	Iowa.	A. Kennedy.

Matriculants.	*Town.*	*State.*	*Preceptor.*
Moffitt, Edward Thomas,	Scranton,	Pa.	L. E. Sayre.
Moller, John Daniel,	Philada.,	Pa.	Dr. Kelly.
Moore, John Demuth,	Wrightsville,	Pa.	P. S. Brugh.
Morrison, James.	Roxboro',	Pa.	William Morrison.
Muir, John Robert,	Lock Haven,	Pa.	E. S. Muir.
Munson, James Harry,	Lancaster,	Pa.	J. B. Moore.
Nebig, William George,	Philada.,	Pa.	C. C. Hughes.
Neeley, Charles Godfrey,	York Springs,	Pa.	H. C. Blair's Sons.
Neil, Wm. Edgar,	Moundsville,	W. Va.	Bullock & Crenshaw.
Neiman, Levi Allen,	York,	Pa.	S. H. Shingle.
Nelson, William Heisley	Philada.,	Pa.	Smith, Kline & Co.
Oetinger, Albert,	Philada.,	Pa.	J. R. Angney, M. D.
Ohl, William,	Peoria,	Ill.	Von Achen & Ohl.
Ousey, Samuel Byron,	Clifton Heights,	Pa.	Barker, Moore & Mein.
Outten, Elmer,	Philada.,	Pa.	S. D. Marshall.
Pantzer, F. Will,	Sheboygan,	Wis.	R. England.
Parker, James Pleasant,	Springfield,	Md.	Hubbell & Parker.
Parrish, Callistus Mitchell,	Ebensburg;	Pa.	W. Lemmon.
Pechin, Edward Vogan,	Philada.,	Pa.	G. H. Johnson.
Pechin, George Joseph,	Philada.,	Pa.	W. H. Lacey.
Pechman, William,	Thurlow,	Pa.	F. M. Reed.
Pemberton, Samuel L.,	Philada.,	Pa.	Bullock & Crenshaw.
Pfaeffle, Robert, W.	Philada.,	Pa.	L. Wolff, M.D.
Pinchback, Pinckney N.,	New Orleans,	La.	Wiley & Harris.
Poehner, Adolph Adam,	Philada.,	Pa.	B. C. Waterman.
Porter, William David,	Mahanoy City,	Pa.	C. D. S. Fruh.
Post, Philip Van Riper,	Passaic,	N. J.	Webb & Gatchell.
Prewett, Samuel Washington,	Columbia,	Tenn.	W. P. Wooldridge.
Prickett, Frank W.,	Wilmington,	Del.	James M. Griffin.
Pritchett, Hartwell Harrison;	Danville,	Va.	H. A. Wiseman.
Rambo, Saml. Lee,	Logan,	Ohio.	F. Harrington.
Rayner, Howard Lincoln,	Philada.,	Pa.	R. Shoemaker & Co.
Read, Clinton Hubert,	Williamstown,	N. J.	Geo. Holland.
Reese, Berch Taylor,	Philada.,	Pa.	Wiley & Harris.
Reighter, Frank Clymer,	Carlisle,	Pa.	S. E. R. Hassinger.
Rentschler, Charles, Jr.,	Bernville,	Pa.	H. T. Haring.
Rhoads, Charles Henry,	Philada.,	Pa.	
Ridington, Wm. Augustus,	Bridgeport,	Pa.	Wm. McKenzie.
Rinedoller, Charles Wesley,	Philada.,	Pa.	C. G. Frowert.
Ringler, George Parsons,	Bloomsburg,	Pa.	S. P. Wright.
Risher, Harry Cooke,	Waco,	Texas.	Castles & Morrison.
Rixstine, Livingston Everett,	Phœnixville,	Pa.	R. G. Stevenson.
Roberts, Joseph VonCulin,	Philada.,	Pa.	G. V. Eddy.
Roseberry, John Mackey,	Phillipsburg,	N. J.	W. D. Robinson.
Rosenbaum, David.	Mt. Vernon,	Ind.	A. Robbins.
Rottner, Charles Selmar,	Philada.,	Pa.	P. Rottner.
Sample, Nathan Welshard,	Wilmington,	Del.	Z. James Belt.
Saurer, Wm. Henry,	Philada.,	Pa.	L. A. Treichler.
Savage, Thomas Albert,	Germantown,	Pa.	W. Conner.
Scarborough, Geo. W., Jr.,	Lambertville,	N. J.	H. M. Brennan.
Schofield, Thos. LaBlanc,	Philada.,	Pa.	Hance Bros & White.
Scull, Andrew Stewart,	Atlantic City,	N. J.	Dr. West.
Seary, Wm. Notson,	Philada.,	Pa.	W. Notson.
Seither, Charles Albert,	Philada.,	Pa.	Bullock & Crenshaw.
Shoemaker. Geo. Washington,	Hummelstown,	Pa.	J. W. Marquardt.
Slaughter, John Virgil,	Rio Grande,	N. J.	C. L. Ross.
Smith, Frank F.,	St. Johnsville,	N. Y.	Jas. Williamson.
Smith, Frank Luther,	Springfield,	Ohio.	E. B. Legg.
Spalding, Charles,	Austin,	Texas.	S. W. Tobin & Bro.

Matriculants.	*Town.*	*State.*	*Preceptor.*
Stager, Edwin Wesley,	Lebanon,	Pa.	J. A. Armstrong, M. D.
Stahler, Harry Lincoln,	Norristown,	Pa.	W. Stahler.
Starr, John Wm.,	Philada.,	Pa.	J. W. Rewalt.
Stearns, Isaac,	Cincinnati,	Ohio.	M. Stearns.
Steinmetz, Wm. Fred.,	Philada.,	Pa.	M. G. Briggs.
Stevenson, Wellington,	Aiken,	S. C.	H. H. Hall & Bro.
Stewart, Harry Clifton,	Wheeling,	W. Va.	H. Mueller.
Sunderland, Harry,	Frankford,	Pa.	J. Frank Wilgus.
Strasser, John Jacob, Jr.,	Trenton,	N. J.	F. R. Jummel.
Strunk, Lewis Curtin,	Quakertown,	Pa.	W. M. Bowen.
Supplee, Wm. Edward,	Bridgeport,	Pa.	Wm. Conner.
Suydam, John Derr,	Philada.,	Pa.	T. E. Conard, M. D.
Swanson, Charles Adolphus,	Jamestown,	N. Y.	J. F. Hayes.
Tatem, Henry Randolph,	Collingswood,	N. J.	I. W. Lutz.
Thompson, Geo. Washington,	Titusville,	Pa.	F. A. Tifft.
Tidd, Harry,	Trenton,	N. J.	M. Tidd.
Todd, James Charles,	Manayunk,	Pa.	W. C. Todd, M. D.
Trauck, Chas. Cadrick,	Tinicum,	Pa.	E. C. Jones & Co.
Trout, Winfield Scott,	Philada.,	Pa.	W. R. Warner & Co.
Vincent, Lorren Stiles,	Flint,	Mich.	O. P. Safford.
Wagner, George Lewis,	Allentown,	Pa.	Martin & Co.
Wagner, William Finley,	Hartleton,	Pa.	H. P. Helwig.
Waln, Charles Herbert,	Yardville,	N. J.	
Ward, Christopher Columbus,	Crisfield,	Md.	Dr. W. D. Blake.
Ward, Joseph Poletus,	Gastore,	Ala.	P. W. Beale, M. D.
Watson, Maurice,	Bristol,	Pa.	S. Douglass.
Wayman, John Martin,	Wheeling,	W. Va.	Ed. Bocking.
Weck, Charles Erastus,	Clyde,	Kan.	P. McDonald.
Wetteroth, Henry,	Bordentown,	N. J.	B. Hankins.
Weyand, William Jacob,	Philada.,	Pa.	Stanbury & Bibby.
Whitney, Heston,	Glassboro,	N. J.	Jas. G. Wells.
Wild, Charles Ferdinand,	Philada.,	Pa.	P. Fitch, M. D.
Wilgus, Wm. Alcott,	Philada.,	Pa.	J. Frank Wilgus.
Wilkinson, Wm. John,	Philada.,	Pa.	J. B. Ferguson.
Williams, Joseph Pearson,	Willmington,	Del.	J. M. Harvey.
Wingender, Wendell Phillips,	Schuylkillhaven,	Pa.	P. W. Beale.
Wissler, Benjamin Abraham,	Millersville,	Pa.	Dr. Reeder.
Wittiger. Hugo Otto,	Kutztown,	Pa.	J. W. Shoffner.
Wyeth, Maxwell,	Philada.,	Pa.	J. Wyeth & Bro.
Yealy, Jas. Frank,	Bellefonte,	Pa.	John Harris.
Young, Frank John,	Detroit,	Mich.	Dr. E. S. Power.
Young, Robt. Taylor,	Philada.,	Pa.	A. B. Wenrich.
Young, Wm. Schrack,	Coatesville,	Pa.	J. C. Roberts.
Zieber, Paul,	Hanover,	Pa.	B. A. Hertsch.

THE AMERICAN
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FEBRUARY, 1886.

FABIANA IMBRICATA; OR PICHI.

By A. B. Lyons, M.D.

In the December issue of the *Therapeutic Gazette* there appeared an article by Dr. Rusby with reference to a new drug which, under the name of pichi (pronounced pee'chee), has acquired considerable reputation in Chili in the treatment of urinary affections. Specimens of the drug have been sent to Europe and to the United States, and its virtues will no doubt be speedily put to the test of clinical experiment.

Meanwhile, opportunity is afforded to make acquaintance from the standpoint of the botanist and of the chemist with the new drug, and I take pleasure in presenting here some preliminary notes on its natural history.

The drug is the product of a solanaceous plant—Fabiana imbricata, *Ruiz et Pavon;* subtribe Fabianeæ, *Miers*—a shrub or small tree, growing on rocky, sterile hill-tops in Chili. As imported, it consists of the branches and leafy branchlets of the shrub, and these bear a close resemblance in general aspect to those of a cedar. The highly resinous character of the drug and its aromatic odor and taste, recall the familiar arbor vitæ, although the foliage bears a closer resemblance to that of the red cedar. In absence of flowers and fruits, even an accomplished botanist would scarcely recognize under such a disguise a member of the natural order solanaceæ.

The accompanying illustrations render minute description of the drug superfluous. The larger stems, 1 to 2 cm. in diameter, are covered with a thin, rather smooth bark, obscurely wrinkled longitudinally, the surface more or less distinctly tuberculate, color brownish gray, with darker or lighter patches. The bark is firmly adherent over a yellowish-white, tough, compact wood. The smaller twigs, 2 to 5 mm. in diameter, are of a darker color, and show (when stripped) at regular intervals scars indicating the points of insertion of the minute leaf-sprays. The leaves are minute scales, about 1 mm. in length, closely imbricated on these numerous sprays.

Dr. Rusby gives the following graphic description of the shrub as he saw it growing in its habitat: "Growing upon high, dry hill-tops, where there is a somewhat sparse vegetation, its plume-like sprays, with their peculiar light, bluish-green color, present a rather pretty

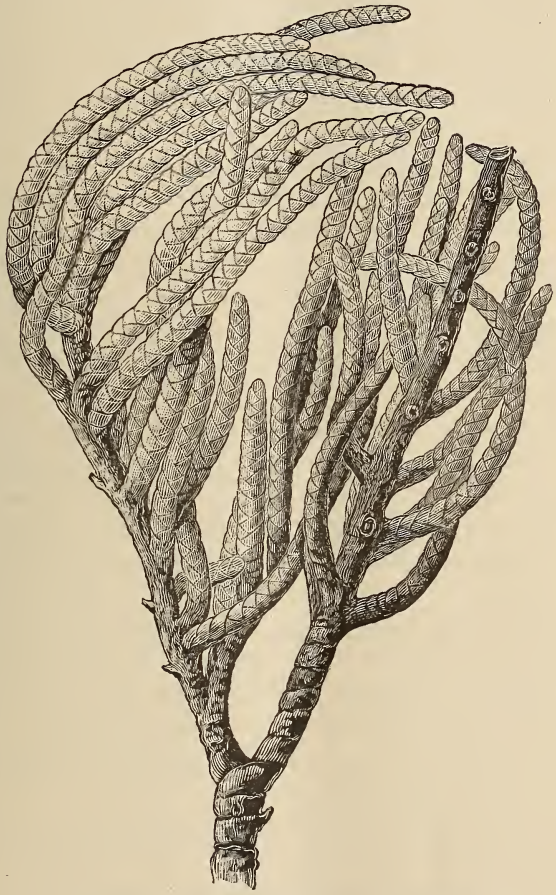


Branch of Fabiana imbricata.
(Natural size.)



Stems of Fabiana imbricata.
(Natural size.)

appearance against the sky, although the shrub is somewhat straggling; more so here than in the south, where it becomes a small tree Seeing one of these sprays without flowers for the first time, it is hard to realize that it is not a conifer, and seems almost incredible that it is in the tobacco family. Handling it, I was astonished at



Branchlet of Fabiana imbricata; 3 diameters.

the great amount of resin with which all its tender parts are covered, this coating, perfectly impervious to water, being an admirable provision of the plant against the loss of its small supply of water during the long droughts of this region." In further description of the plant, the Doctor says: "The minute branchlets are densely

crowded and terminated in the second year by the solitary flower. The white, nerved, withering, persistent corolla is $\frac{1}{2}$ inch long, four times the length of the bell-shaped calyx, funnel form, with fine lobes. Fruit an oblong, ovoid, light-brown, crustaceous capsule, $2\frac{1}{2}$ lines long; seeds about four, $\frac{1}{2}$ line long."

From Dr. Manuel S. Ramires, of Valparaiso, Dr. Rusby learned that the remedy had proved curative in a case of calculous disease which had baffled the skill of physicians, and, the patient being a man of influence, a wide-spread interest had been awakened in the drug. Dr. Ramires had himself made a pretty careful study of the drug, finding it a diuretic of considerable importance, but inapplicable to cases of kidney disease in which there was degeneration of the excreting organ. He considered it a valuable remedy in catarrhal inflammations of the urinary tract, but believed that its action in restoring impaired digestive power was even more important than its diuretic property. He had found it also a hepatic stimulant, although this action might be secondary, and dependent upon improved digestion.

Dr. Rusby made a chemical examination of the drug, ascertaining that its abundant resin was soluble in ether, to a certain extent in ammonia, being reprecipitated by sulphuric acid, and that its alkaline solutions had a most intense blue fluorescence. Aqueous solutions gave no reactions with the ordinary reagents for alkaloids, except solution of iodine in potassium iodide. On the strength of this latter reaction, however, the Doctor was inclined to regard the bitterness of the drug as due to an unknown alkaloid. The Doctor was unable to make any complete examination of the drug, owing to lack of reagents and laboratory facilities; indeed, with the means at his disposal, he is entitled to much credit for having so clearly indicated the direction of further research.

A preliminary examination of the drug by the writer has yielded the following results of interest:

Ten grams of the drug in fine powder was treated with 100 c. c. of petroleum ether. After macerating twenty-four hours, with occasional shaking, crystals were observed to be forming on the sides of the bottle. After several day's maceration, 25 c. c. of the petroleum ether was evaporated and found to contain 280 milligrams of extractive matter, reduced by heating for some time at 105° C. to 260 mg., the loss in weight due to volatilization of essential oil, and traces of

moisture. The petroleum ether had extracted more than 10 per cent. of the weight of the drug. Of this extract alcohol dissolved all but 30 milligrams, the residue consisting of fatty and waxy matter, which in burning produced an odor similar to that of burning india-rubber.

Water dissolves a very small portion of the extract, producing a somewhat bitter solution, which, on addition of ammonia, becomes strongly fluorescent. Of the resinous portion, taken up by alcohol, ammonia dissolves only a part, producing a solution having a terebinthinate bitter taste.

Ether extracts about 33 per cent. of the drug, the extract having the consistence of a soft resin, with the characteristic odor and taste of the drug. If to the ethereal solution a few drops of an alcoholic solution of ammonia are added, a precipitate is at once produced, which gradually assumes the crystalline form. The same thing is true of the solution obtained with petroleum ether. The crystals are white, delicate needles or scales, tasteless, insoluble in water, soluble in chloroform, hot alcohol even when somewhat dilute, crystallizing readily from its solutions in most of these solvents fusible at a somewhat elevated temperature, burning with a smoky flame.

It is apparently indifferent to the action of acids and alkalies, except that it is thrown out of some of its solutions, as already stated, by alkalies. Probably it is inert, but we must not too hastily draw this conclusion from its insolubility and tastelessness.

Tinctures of pichi made with moderately strong alcohol, deposit crystals also of this substance, which is the same, no doubt, as that which crystallizes spontaneously from the solution in petroleum ether.

The ethereal extract contains a larger proportion than the benzin extract of the fluorescent principle to which reference has been made. This principle resembles in its general properties æsculin; it is soluble in petroleum ether sparingly; in alcohol freely; in ether, chloroform and other similar solvents. Cold water dissolves it sparingly, hot water more freely; from its aqueous (acid) solution it may be removed by shaking with chloroform, or a mixture of chloroform and ether. It is not easily induced to crystallize, and in this respect differs from æsculin. This may be due, however, to the presence of impurities, and my experiments have not been sufficiently numerous to warrant me in saying that it is not crystallizable.

A tincture of the drug, prepared with 75 per cent. alcohol, was

precipitated by pouring into a large volume of water. The solution was filtered, concentrated, considerable resinous matter separating during this operation. When reduced to a small volume, the solution was shaken with chloroform, and the resin which had separated was washed also with the chloroform. The chloroformic solution, when evaporated, left a residue of the consistence of a soft resin, of a rich, red-brown color. This was treated with hot water which dissolved a large part of it. The solution was intensely bitter. On adding neutral acetate of lead, a scanty buff-colored precipitate was thrown down. This was removed by filtration, and basic acetate of lead was then added, producing a bulky, slimy, bright-yellow precipitate, which was readily soluble in acetic acid and reprecipitated by ammonia. The filtrates from both of these precipitates, and the wash waters, also, were strongly fluorescent. The precipitates themselves, after moderate washing, were decomposed by dilute sulphuric acid, and the solutions thus obtained both exhibited fluorescence, that from the yellow precipitate becoming of a deep yellow color on addition of ammonia. Whether the fluorescent principle was incompletely precipitated by one or the other of the reagents, or whether there are two or three distinct fluorescent compounds present, these experiments did not decide, and the question remains an open one, which, however, continued investigation may enable me to decide. In all cases the fluorescent solutions have been observed to be bitter, and I am strongly inclined to regard the bitterness as belonging to the fluorescent substance.[1]

Not having succeeded in isolating this substance, I am not able to affirm that it is a glucoside, but this is extremely probable. The impure substance produces with nitric acid and ammonia color reactions similar to those obtained from æsculin, and after boiling with an acid reduces copper solutions.

[1] In continuing the study of these compounds, the writer reports that he finds the fluorescence to reside mainly in the substance precipitated by subacetate of lead. This substance, when freed from the lead, proves to be partially soluble in chloroform. The portion dissolved by chloroform readily assumes the crystalline form; it is exceedingly bitter, but apparently not more so than the portion of the original aqueous solution not precipitated by lead subacetate. It gives with nitric acid, followed by ammonia, the same color reaction as æsculin, and the color of its ammoniacal solution, and the intensity of the blue fluorescence of its dilute solutions, are identical with those of æsculin, but its bitterness and its solubility in ether appear to constitute differential characteristics.

By treating the drug with Prollius' solution, I obtained an ethereal fluid from which acidulated water removed a not inconsiderable quantity of alkaloid. The concentrated solution gave with Mayer's reagent a heavy white precipitate; with picric acid a yellow; with phosphomolybdic acid a yellowish white; with tannin a tawny; with iodine solutions a brown precipitate. The solution had a bitter taste, and when evaporated yielded minute, well-defined crystals. The quantity of alkaloid is small, certainly less than 0·1 per cent., but this quantity is not so minute that we are warranted in concluding of necessity that the drug owes its efficacy to other constituents. Whether it is a new alkaloid, however, remains to be determined; also, what physiological, toxic or therapeutic properties it may have, and these questions can be solved only when a sufficient quantity of the alkaloid has been prepared to render its study possible.

Should the alkaloid prove to be a new one, it will naturally take the name fabianine.

To sum up the results justified by the preceding examination, Pichi contains—

1st. A minute quantity of some alkaloid, probably peculiar to the drug, and capable of forming crystallizable, bitter salts.

2d. A neutral, crystallizable principle, rich in carbon, insoluble in water, tasteless, and probably inert.

3d. A fluorescent body (perhaps more than one) closely resembling æsculin.

4th. Volatile oil.

5th. A bitter resin, probably complex in composition, present in great abundance, soluble in alkalies, reprecipitated by acids, not fluorescent, soluble in ether and chloroform, very sparingly in water and in petroleum ether.

It seems probable that the three last named constituents are the important ones, unless, indeed, there be a bitter in addition to the fluorescent principle, which dissolves somewhat freely in water. The tincture of the drug has a very clinging, disagreeable bitter taste, and unless an alkali is added, it precipitates much resin when mixed with water.

We may hope that before long clinical experiment will determine positively what therapeutic value the drug possesses, and which of its constituents may be regarded as its active principle.

January 8, 1886.

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

By the Editor.

Continued from page 24.

Palo del muerto, Ipomœa muricoides, *Kunth;* Convolvulaceæ; in the Mexican valley, Tenango, &c. The decoction of the branches is used in baths against paralysis, and in the same manner is also employed I. arborea, *Kunth*, which is abundant in the interior of the country. The former plant yields by incisions a gum-resin, and contains, according to Gomez, tannin, gum, sugar, red coloring matter and a white crystalline principle, which is soluble in ether and chloroform, and has an aromatic odor similar to that of the flowers.

Palo mulato de México, Xanthoxylon pentanome, *De Cand.;* Rutaceæ; in the Mexican valley. The wood comes in pieces of different dimensions. The bark is thick, hard, covered with a yellowish, slightly adhering layer; the periderm underneath is greenish ash-colored in its outer layers, and red brown in the inner layers; transverse fracture uneven, showing alternating reddish and whitish or gray lines; liber chalky white; inodorous; taste on mastication pungent and acrid; wood yellowish-white, coarse. According to Mendez the drug contains resin, tannin, coloring matter, saponin-like substance, glucose, gum, extractive and a crystalline nitrogenous body which is soluble in alcohol and chloroform, and is probably an alkaloid. It is tonic, stimulant and antisyphilitic, and in Veracruz the infusion is used in black vomit.

Papayo, Carica Papaya, *Lin.;* Papayaceæ; in Yucatan, Cordoba, Puebla and other hot and moist localities. The juice of the green fruit contains a caoutchouc-like substance, fat, resins, albumin, bitter extractive, malic acid, pectin, salts, and a peculiar ferment, papaïn. Dr. José Font recommends the juice for the cure of dyspepsia; a spoonful of the juice acts as a vermicide. The root, leaves and seed have similar properties. The juice of the ripe fruit is made into a syrup which is employed for the cure of bronchitis.

Parietaria, Parietaria pennsylvanica, *Muhlenberg;* Urticaceæ; in Mexico, &c. Diuretic. The infusion is made from 5 to 14 gm. of the plant to the liter. Dose of the extract 1 to 6 gm.

Peonía verdadera, Pæonia officinalis *Lin;* Ranunculaceæ; cultivated. The root and seeds are employed to a limited extent; antispasmodic; dose 0·30 to 2 gm. The drug is popularly used in convul-

sions of children. The tubers of Cyperus rotundus *Lin.*, which is known as peonía del país, are improperly used as a substitute for the preceding.

Picoso, Croton adenaster, *Jimenez;* Euphorbiaceæ; in Querétaro. Stem cylindrical, stellately hairy; leaves ovate-lanceolate, covered with stellate hairs principally upon the lower surface; the margin with numerous pedicillate pyriform yellow glands; stipules with like glands; inflorescence in small monœcious racemes, having the pistillate flowers at the base; fruit spherical, hairy, three-celled, three-seeded, of a burning taste. Laso de la Vega (*Observ. Méd.* iv, 17) found in the plant black resin soluble in ether, acid oleo-resin, volatile balsamic matter, tannin, various coloring matters, extractive and salts. The plant is used as an antiperiodic, an infusion being prepared from 1 or 2 gm. of the leaves to 500 gm. of water.

Pipitzahoac, Trixis fruticosa, *C. H. Schultz,* Tr. Pipitzahuac, *G. Schaffner;* Compositæ; in Tenango, the eastern mountains of the Mexican valley, &c. The rhizome with the roots is employed. Rhizome horizontal, tortuous, covered with a thick brown layer; with stem-scars on the upper side; rootlets numerous, cylindrical, about 5 Mm. ($\frac{1}{5}$ inch) thick, dark gray, longitudinally wrinkled, and near the meditullium with a reddish-yellow crystalline powder of the natural resin having an acrid taste. The virtues of the drug are due to this resin. Drastic purgative; dose 4 to 8 gm. (see also *Amer. Jour. Phar.* 1884, pp. 185, 193). The powdered drug or the acid, internally administered, usually imparts a greenish color to the urine.

The Pharmacopœia recognizes also *acidum pipitzahoicum*, which is directed to be prepared from the roots deprived of the rhizome, which are washed with water, dried, powdered, exhausted with 82 pr. ct. alcohol, and the strong tincture precipitated by slowly pouring it into water. Thus prepared it is an active drastic in doses of 0·20 or 0·30 gm. and forms a crystalline powder varying in color between bright canary yellow and deep reddish; soluble in alcohol, ether, chloroform and carbon bisulphide, fusible to a reddish-yellow liquid, which gives off yellow vapors condensing partly as an oily liquid and partly as brilliant yellow prisms; the vapors are inflammable and burn with a bright and sooty flame. Its most characteristic reaction is the behavior with alkalies: on adding a drop of its alcoholic solution to water, followed by a little ammonia, a violet color is produced. R. Anschütz and F. Mylius have recently (*Berichte,* 1885) shown that the above

compound belongs to the class of quinones, and the name *perezone* was proposed for it by the latter.

For the preparation of *pipitzahoina,* the crude pipitzahoic acid is directed to be put in a thin layer upon a porcelain plate, covered with a glass funnel; a gentle heat is applied by means of a sand bath, and when the sides of the funnel are covered with crystals, the white ones are collected, and those near the lower edge, which are usually colored, are again sublimed. The compound forms prismatic needles and crystallizes from its solutions in plates; it is white, fusible, volatile, neutral to litmus paper, inodorous and tasteless, but finally slightly bitter. It is insoluble in water, soluble in alcohol, ether and chloroform, also in potassa, the latter solution being precipitated by acids, while the alcoholic solution is precipitated by sulphuric acid, the precipitate being soluble in alcohol. Nitric acid converts the compound into a yellow amorphous resin.

Plátano. The species most common in Mexico are Musa paradisiaca, *Lin.,* known as plátano largo (plantain) M. sapientum, *Lin.,* the plátano guineo or camburi (banana), M. regia, *Lin.,* the plátano dominico or costeño, and M. coccinea, *Andrews,* the plátano rojo de China. The fruit contains sugar, gum, malic acid, gallic acid, albumen and pectin, and in the green state much starch. The juice of the stem is used as an astringent and the fruit of the banana is popularly regarded as pectoral; the green as well as the ripe fruit is alimentary.

Pochote, Eriodendron anfractuosum, *De Cand.;* Bombaceæ; in hot and damp localities. The gum which exudes from the stem, is used in enteritis; the fruit is comestible and the cotton which surrounds the seeds is utilized for filling cushions, &c. The same uses are made of the ceiba espinosa, Eriodendron leiantherum, *De Cand.*

Polígala mexicana, Polygala mexicana, *Flor. Mex. ined.,* Pol. scoparia, *Kunth;* Polygalaceæ; near the city of Mexico. The root is mostly simple, slender, tortuous, in the centre and in the outer layers resembling senega root, as well as in odor and taste. Simeon obtained from it sugar, starch and bitter extractive, the latter in about one half the proportion obtainable from senega. In small doses of about 0·20 gm. it is used as a tonic, and in doses of 2 or 3 gm. as an emetic.

According to Schiede, Spermacoce diversifolia (Rubiaceæ) which has different properties, is used in place of polygala; and Cal states that Pol. tricosperma is substituted for senega. Pol. rivinæfolia is found

in Ario and in Morelia; Pol. lutea in Guadalajara, Pol. amara in Tepatitlan and Pol. americana in Veracruz.

Ponchishuis, Asclepias currasavica, *Lin.;* Asclepiadaceæ; in Huasteca, Yucatan, &c. From 3 to 9 drops of the milk-juice act as a powerful emeto-cathartic, and it is also used as an antiperiodic and vermifuge. The extract of the juice is violently sternutatory, and to the stem are attributed the same properties as to sarsaparilla and China root. Dr. Leon of Tabasco believes the root to be useful in asthma and other nervous affections; in doses of 1·0 to 1·5 gm., taken in three portions, it acts as an emetic, and in smaller quantities it is purgative. The leaves, topically applied, are said to cure cancer; according to Dr. Hamilton they possess useful hæmostatic and antiblennorrhagic properties. All preparations of this plant should be used with great care.

Prodigiosa, Athanasia amara, *Cervantes;* Composìtæ; in the Mexican valley. Leaves rough, orbicular, with rounded lobes; heads hermaphrodite; involucre calyculate; corolla yellow, tubular, five-lobed; style bifid, terminating in two small tufts of hairs near the stigmatic lines; akenes crowned with a chaffy pappus. The entire plant is used as a bitter tonic and vermifuge.

Quauchichic, Carya ovata; Juglandaceæ; in the mountains near the Mexican valley. The bark enjoys considerable reputation for the cure of atonic diarrhœas.

Quaumecatl, Serjana mexicana, *Willdenow;* Sapindaceæ; in hot and moist localities. The infusion of the root is diuretic.

Quelite, Chenopodium viride, *Lin.;* Chenopodiaceæ; in the Mexican valley. The leaves are alimentary and emollient.

The following well known drugs have been admitted: Quina (cinchona barks), Rábano cultivado (radish), Rábano rusticano (horse-radish), Rapóntico (European rhubarb), Romero (rosemary), Rosa de Castilla (rose petals), Rubia or Granza (madder), Ruda (rue), Ruibarbo de China, Sabina, Sagapeno, Sagú (sago), Salep, Sándalo cetrino (sandal wood), Sándalo rojo (red saunders), Sandía or Zandía (watermelon seed), Sangre de drago (dragon's blood), Santónico, Sassafrás (root bark), Sauz (willow bark), Sen (senna leaves), Serpentaria de Virginia (Virginia snake root), Simaruba, and Sumbul.

Raíz de China de México, Smilax pseudo-china, *Schlechtendal;* Smilaceæ; in the states of Morelos, Colima, &c. The root is large, oblong, tuberous, externally bright red, internally reddish and when cut with a saw, of a mahogany color, astringent and somewhat bitter;

in the dry state readily attacked by insects. It is used as a substitute for the root of Smilax China, *Lin.*, the decoction being employed in dropsy and as a diaphoretic and depurative.

Raíz del manso, Echinacea heterophylla, *Don*, Helianthus glutinosus, *Fl. Mex. ined.;* Compositæ; in Puebla, &c. Cal (*Mat. Med. Mex.*, 1832) describes the root as being tuberous, cylindrical, externally gray and striate, internally white, becoming yellowish; when cut in the fresh state it has an odor resembling turpentine and emits a sticky juice, which on drying is resinous. It contains 12·11 resin, 15·62 gum, and 46·87 extractive. It has considerable reputation as a vulnerary, and the decoction is used in dysentery. The resin has a clove-like color, a saffron-like odor, and a taste which is bitter, afterward acrid and persistent.

Romeritos, Chenopodina linearis, *Moquin;* Chenopodiaceæ; in Central Mexico. The leaves are used for emollient cataplasms and as a pot-herb.

Rubia lævigata, *De Cand.*, grows in the neighborhood of the capital, and has the same tinctorial properties, though in a less degree than the madder of commerce.

Sagitaria, Sagittaria sagittæfolia, *Lin.* Alismaceæ; in the Mexican valley, also in the United States. The rhizome is astringent; the tubers are comestible and may be used for obtaining starch.

Salvia. Instead of S. officinalis, Buddleia globosa, *Lamarck*, Scrophulariaceæ, is usually found in the shops of the city of Mexico, and the salvia poblana, Verbena callicarpiæfolia, *Kunth*, Verbenaceæ, is very generally employed. The latter has a quadrangular stem; leaves opposite, ovate-elliptic, dentate, rugose, hairy and spiny on the upper side, and covered with canescent hairs beneath; bracts large, many-nerved, of a handsome violet color; calyx bifid, externally villous and hispid; corolla elongated, funnel-shaped, glandular above; odor strong and agreeable; taste pungent and somewhat bitter.

In other parts of the country the following species are employed: Salvia polystachya, *Ortega*, in Guadalajara; S. chrysantha, *Martius*, in Oaxaca; S. aspera, *Martius*, in Tehuacan; S. Sessei, *Bentham*, in Tuxpam; S. regia, *Cavanilles*, in Villalpando and Aguascalientes; S. fulgens, *Cav.*, in the Mexican valley, &c.

Samatito, Ficus complicata, *Kunth;* Urticaceæ; in hot districts. The milk juice is used as a resolvent, the same as that of F. benjamina, *Lin.*, which is commonly known as "amate."

Sangre de drago. Besides the commercial dragon's blood, this name is applied in Mexico to the resins of several plants, chiefly to that of Pterocarpus Draco *Lin.* (Leguminosæ) and of Croton sanguifluum, *Kunth* (Euphorbiaceæ), the latter known as "Ezquahuitl" or "Árbol de sangre." The juice and the branches of these plants are astringent.

ON WHITING AND ITS MANUFACTURE.

By Joseph W. England, Ph. G.

(Read at the Pharmaceutical Meeting, January 19th.)

Among the varied industries whose products have found general employment and received numerous applications in the arts and sciences, the preparation of purified chalk may properly claim our attention, and a few remarks incidental to its commercial history and preparation for market, may be of interest.

Amongst its many applications we quote: For medicinal purposes in the form of the so-called "Creta Præparata" we find it internally employed for its well-known antacid and astringent qualities, or externally for the healing of burns, ulcers, intertrigo and other cuticular affections; and then, chemically, for the preparation of various lime-salts. Moulders use its finest grades, in connection with plastic clay and glue, in the mouldings upon picture frames, preparatory to gilding; while in oil-cloth manufacture, it serves as a basis in the application of other materials. Mixed with a variety of colors, it forms the water-color pigments, and is also utilized in the sizing of wall papers. When strongly heated it may readily be converted into lime and used either as a cement in connection with other materials or for fertilizing land; the immediate effect being to render the soil more able to retain moisture and to improve its texture. It is very largely used as a basis for some cheap colored paints, but its great lack of the body that characterizes the lead product, prevents its more general adoption, except as an adulterant. Latterly, it has been applied in the preparation of carbonated waters by mineral water manufacturers, some of whom state that the relative proportion of marble dust used to whiting is as 1:3 or 4. Its well-known cleaning properties upon glass, or metallic surfaces, when freed from hard, crystalline siliceous particles, to prevent scratching, and its use in making putty with linseed oil, are too well-known to require more than mere passing comment.

The main source of supply of commercial chalk, is from the cliff-hills along the shores of the North Sea and the banks of the English Channel, where it is found in deposits of vast extent, consisting of foraminiferous microscopic shells, through which are occasionally distributed more or less rounded nodules of flint, together with, very rarely, a specimen of petrified fish. Chemically, it is almost wholly calcium carbonate ($Ca\ CO_3$), with small and varying traces of ferric oxide (Fe_2O_3), alumina (Al_2O_3), magnesia (MgO) and silica (SiO_2). The so-called "French Chalk" or Talcum, P.G., does not contain any calcium carbonate, but is a hydrated magnesium silicate ($4MgSiO_3 \cdot SiO_2 \cdot 4H_2O$).

Next, and of far less importance than the common, white variety, we have "Black Chalk," a soft carbon-like schist that may be used in writing or drawing; "Brown Chalk," an umber-like body, and "Red Chalk" or "Riddle," an impure earthy variety of hæmatite. The red varieties, in general, may contain as much as 9·28 per cent. silica, 9·6 per cent. ferric oxide, and 1·43 per cent. alumina[1] and the Norfolk red chalks, in particular, leave, on treatment with acids and subsequent drying, 9·3 per cent., argillaceous residue, consisting of water, ferric oxide and alumina, with a small proportion of magnesium and potassium.[2]

Chalk is brought from Hull or London, England, on board ships as ballast, in the form of yellowish-white or white (with occasional streaks of red from traces of ferric oxide), insoluble, soft and friable earth-like masses, irregular in shape and size, variable in weight and having a rough, irregular fracture, and insipid taste; specific gravity varying about from 2·4 to 2·6; absorbent of moisture; containing 5, 10, 20, or more, per cent. of water. Cliffstone is the name given to a variety of chalk, from which it differs, mainly, in being much more hard and stone-like.

For the year ending June 30, 1884, the amount of unmanufactured chalk admitted into the U. S. ports,[3] duty free, amounted to 33,677 tons, having a value of $26,856, while unmanufactured cliffstone, a variety of chalk previously referred to, amounted to 6,003 tons, having a value of $11,701. Independently of this, for the same year, 5,000 to 6,000 tons were withdrawn from private storehouses, where

[1] *Chem. News*, 1862, Vol. 6, p 313. Chapman.

[2] *Chem. News*, 1875, Vol. 36, p. 199. Church.

[3] *Commerce and Navigation* (U. S.) *Reports*, 1884, p. 182.

they had remained on storage from previous years, and also used; making the total sum used about 45,000 tons.

After importation into Boston, New York, Philadelphia, Baltimore, or New Orleans, it is there purified and prepared at "Whiting Works." Of these there are in Philadelphia eight in active operation, with an estimated yearly capacity of 22,000 tons, or 50 per cent. of the whole product manufactured in the country.

The source of supply is not necessarily limited to England, since France exports from her shores a much finer crude product; the only objection to whose employment, in certain cases, being its lack of body, yet, if desired, the English article and it may be mixed with the best of results. In our country an inferior quality, and apparently limited supply, is furnished by the states of North Carolina, Colorado, and the interior of Dakota, which has, as yet, failed to receive any especial attention, or whose development has not been deemed of sufficient importance to prosecute.

On its reception in the yards of the refining-works, the crude chalk is stored in wooden bins, from whence, as needed, it is placed on wheelbarrows and shoveled from there into large cylindrical tanks, through which a stream of water is constantly rushing, where it is ground in water by massive rotating disks of iron, weighing from 4 to 5 tons each.

From these tanks, by the current of running water, through an outlet on the side, flows the milky stream of suspended chalk, the impurities of silica and flint having to a large extent remained in the tank, from whence they are removed as occasion may require; the liquid is conducted through irregular, snake-shaped conduits, in order to separate the heavier, coarser particles of partly crushed chalk that may have been forced along by the current of liquid into a larger, longer and straight conduit, leading in succession to enormous wooden settling bins, having a volumetric capacity of over 5,000 gallons each of water. In the establishment visited, there were sixteen of these bins, placed successively along the whole side of the building. Now the running stream slowly flowing from the first to the last bin, through the long wooden channel provided for it and connected with each bin in its passage, gradually deposits by gravity, on standing, the coarse grade in the first, finer in the second, still finer in the third and so on until the last bin is reached, where the deposit is very slow and the product obtained correspondingly fine.

At the base of each of these wooden bins are sluice-gates opening

into large, square, open iron tanks in front, under which is conducted, by draught, a current of strongly heated air from kilns, placed in front, so regulated in temperature as never to exceed 300° F.

At the proper time, which ranges from five to six days for the first, to from six to eight months for the last, each bin is closed, the excess of water drawn off from above, and pumped to a large tank upon the roof of the building, for re-use in grinding crude chalk, and the sluice-gates below are opened to allow the white, viscid mass to flow into the flat, open tanks in front. As soon after heating as the mass becomes sufficiently plastic, it is cut into blocks of about one cubic foot, weighing 20, 30 or 40 pounds. The instrument used to do this division is technically called a "Scorer," and is simply a long, stout pole, at the end of which is attached an L shaped piece of iron. The mass is then again slowly heated, from beneath, to still further expel moisture.

From there these blocks are conveyed on tramways and taken to the drying-room above, where they are exposed on large trays to the continued draughts of atmospheric air, to promote thorough dryness; which point of the process is reached in one or more weeks, according to the condition of the weather. Then these blocks are powdered. bolted, graded and packed in barrels of about 300 pounds each, for shipment, as kiln-dried whiting.

To a limited extent, in comparison with the previously described process, there is another mode of manufacturing practiced, whose only difference consists in the method of drying employed, which, in this instance, is done by simple exposure of the viscid, elutriated chalk to the air, without previously heating to expel contained moisture and then proceeding as before mentioned. This product so obtained, is called air-dried whiting, in contradistinction to the kiln-dried body and must of necessity contain a certain percentage of unexpelled moisture; the presence of which rendering it, by giving what is called "body," more fit for certain uses in the arts than the kiln-dried substance.

In the grades of whiting mainly supplied to markets, samples are presented in the order of their grade of fineness; the lowest grade being mentioned first, the finer second, the still finer third, and so on. *A* is "Chalk" in crude form. *A* No. 1, is "Commercial," the lowest grade made from chalk. *A* No. 2, is "Gilded," the next higher grade made from chalk. *A* No. 3, is "American Paris White," the finest grade of all made from chalk. On the other hand we have *B* as

"Cliffstone," from which only one grade is made, and that is shown as *B* No. 1, "Cliffstone Paris White." Each of these grades, here shown, are products of the kiln-dried method, and differ from each other in fineness of powder and certain physical qualities which adapt them for various special uses.

It may be of interest, at this time, to present a table of whiting analyses (kiln-dried product). The specific gravity of each, in the powdered state, was taken in a specific gravity bottle and may vary in some instances from the moisture absorptive power of certain of the powders, hence they must be considered as relatively approximate and not as a standard. Concerning the estimation, of the constituents, alumina, ferric oxide and magnesia, they were present in such small quantities, in chalk and cliffstone, that their determinations were ignored. The moisture was calculated by heating 1 gm. of the powder, of each grade, in an air-chamber, at a temperature of not more than 212° F. (100° C.) for one hour or more, until it ceased to lose weight. The quantity of silica present, which, in the whitings at least, was the amorphous variety, was found by dissolving the dried powder in acetic acid, filtering through tared filters, washing thoroughly with distilled water, and weighing residue on the filter, after thorough drying, as silica. The calcium carbonate was estimated by the difference between the sum of the moisture and silica, and the total weight of the dried powders used (*i. e.*, 1 gm.). Since the crude products vary greatly, and the manufactured goods differ to some extent from each other, according to the maker, the results of the table appended cannot be taken as a standard, but as only an approximate indication of the general constitution of whiting.

TABLE OF WHITING ANALYSES.

Grades.	Sp. gr.	Moisture (pr. ct.)	$CaCO_3$ (pr. ct.)	Silica (pr. ct.)
A.				
No. 1, Crude Chalk	2·63	5, 10, 20	91, 86, 76	4·
" 2, Commercial	2·5		96·5	3·5
" 3, Gilded	2·38		97·	3·
" 4, Am. Paris White	2·32		98·	2·
B.				
No. 1, Cliffstone	2·63	5, 10, 20	90·5, 85·5, 75·5	4·5
" 2, C. Paris White	2·5		96·	4·
C.				
No. 1, Creta Præparata (U.S.P.)	2·5		96·	4·
" 2, Calcii Carb. Præc. (U.S.P.)	2·25		100·	

Upon examination of this table, it will be seen, from the very mode of preparation, *i. e.*, deposition by gravity on suspension in water, that the density of each product decreases, as the product becomes finer. Creta Præparata (U. S. P.) appears to be made from Cliffstone Paris White, and, in density, Calcii Carbonas Præcipitatus (U. S. P.) resembles American Paris White. A decrement of the amount of silica present as each sample becomes finer, will also be noticed, and the extreme difficulty of the total separation of silica, by the present method of manufacture, may be readily seen, when a comparison is made between the specific gravities of that substance in its natural amorphous condition with whiting densities. Unfortunately, in the present instance, the two main authorities depended upon differ to some extent with each other. Fownes,[4] indefinitely, gives its density as somewhat above 2, while Frankland and Japp[5] state it to be 2.3. It is more than probable that the latter figure is nearer the correct one, though it may be still higher since Fownes[1] also gives 2·66 as the specific gravity of artificial amorphous silica, while Frankland and Japp[2] claim the same to have a specific gravity of 2·2. There is then, clearly, an error in density on the part of one or both. Of moisture there was none in the samples examined, as obtained by the writer from the manufacturer's hands. Whether all makes will bear out this record is not known, as only the one make was examined.

The point suggests itself, that if a form of calcium carbonate is desired for medicinal uses and is employed under the term "Creta Præparata," which at present is made from Cliffstone Paris White, containing 4 per cent. of silica, why not make a purer preparation by using American Paris White, containing only one-half that quantity of silica, which certainly must be preferable for such uses. A sample of Creta Præparata, made from American Paris White, in the familiar nodular form is here presented as *C* No. 3. The impossibility of making these cones to keep permanently hard, when prepared from precipitated calcium carbonate, may here be mentioned, and arises from the fact that under the microscope, diffused through water, the powder of precipitated carbonate appears in minute crystals, all of equal size, while in the form of whiting, under the same conditions, the appearance is that of minute crystals widely different in sizes, and it seems to be a physical law that when small crystals of equal size are

[4] Fownes *Elementary Chemistry* (Watts) p. 224.

[5] Frankland and Japp's *Inorganic Chemistry*, p. 317.

dried together in the presence of moisture they have much less cohesion with each other than when the reverse is the case. A sample, as C No. 4, "Creta Præparata," made from the precipitated carbonate, is shown. You will note its friability.

It will thus be readily seen, that this industry has rapidly assumed much greater importance than that which it formerly held, requiring as it does heavy capital for its successful prosecution as a business in the purchasing of improved machinery and the employment of skilled labor.

HEEREN'S MILK-TESTER.

By Joseph W. England.

(Read at the Pharmaceutical Meeting, January 19th.)

As a possible successor to the lactometer for the valuation of milk densities, I would show for your inspection one of "Heeren's Milk-Testers," manufactured by the Hanover Vulcanite Co., of Hanover, Germany. There is only one agency of the manufacturers, I believe, in this country, and that is located at Baltimore.

The directions for use accompanying the "tester" are as follows: "Place some drops of the milk (not boiled) to be tested on the middle of the black plate, and then lay the glass plate, with its colored side turned downward on the milk, so that the transparent part of the glass plate rests on it. The milk thus pressed together will assume a different shade of color, which will correspond, or nearly so, with one of the various shades on the glass plate, and the quality of the milk will be indicated by the scale on the edge of the plate."

Now, the principle upon which this "tester" seems to rest is apparently dependent upon the action of the light rays in traversing through the flattened sample of the milk upon the central disk of vulcanite, which encounter a resistance in their passage through the film of liquid proportionate to its opacity, so that when a relatively thick liquid like "cream" is taken for inspection, the light rays are almost wholly intercepted in their passage, and the color afforded by the test is almost white.

Then, reversely, "very poor milk" affords almost black color, or rather, a deep bluish-black, from the relative ease with which the light rays penetrate to the black disk; the intermediate grades, which vary between "cream" as the highest, and "very poor milk" as the lowest, being known as "very fat milk," "normal," "less fat," and

"poor," according as they are light slate, slate, light blue, and blue in color.

For the purpose of ready comparison, the series of the six colors, with the names of each grade attached, are arranged, concentrically, around the central, transparent circle of the glass disk of the glass plate, and any variation in color from the standard is thereby quickly detected.

Whilst the results of this method would not probably be received as evidence in law, yet in ordinary practice, for the approximate estimation of the comparative value of milk and the ready ascertainment it would give of the presence of added water, it stands among the very best of the instruments in present use, and is deserving of more general employment.

MAURY'S OINTMENT.

By Joseph W England, Ph.G.

(Read at the Pharmaceutical Meeting, January 19th.)

Under this name, an unctuous solid was first formulated and introduced into the Philadelphia Hospital, some eight years ago, by Dr. Maury, then a visiting physician of that institution, for the external healing treatment of sores, ulcers, etc., in general, and as especially serviceable in external affections of the skin, dependent upon venereal origin. Since that time, in the medical practice of the Hospital referred to, it has been constantly employed by the resident physicians, with a more than ordinary uniform success.

Thinking the subject might be a matter of general pharmaceutical interest, I present the formula for its preparation, as there practiced, and submit, at the same time, for your personal inspection, a sample of the ointment made yesterday. It may be added that the original formula contained simple cerate (Ceratum, U. S. P.) as the diluent, and not cosmoline, as hereafter mentioned:

℞

Nitrate of mercury ointment, ℥i.
Powdered rhubarb,
Powdered opium, aa, ℥ss.
Cosmoline q. s. ad ℥i.

Triturate the rhubarb and opium together with the cosmoline, until a perfectly smooth, homogeneous product is obtained. Then admix

with it the citrine ointment, after having previously rubbed the same with about one fluid drachm of glycerin to remove any granulation present, using in the latter action a bone spatula to work with.

The ointment, when freshly made with cosmoline as the diluent, is a soft, unctuous, greenish-brown solid, readily melting at the temperature of the body and capable of being absorbed by the skin. It changes rapidly, on exposure to air, to a very deep brown color. The partial change of chemical nature, as evidenced by the change of color, does not appear to affect the medical qualities of the article in question, as every-day usage has fully demonstrated that the old ointment was as efficacious as the new.

Its mode of application is somewhat peculiar and worthy of especial mention. The part to which the ointment is to be applied must first be poulticed with a hot "Labarraque poultice," that is, a poultice of flaxseed meal, made with hot "Labarraque's solution" (Liquor sodæ chloratæ, U. S. P.), instead of the hot water ordinarily used. After remaining on for awhile, the poultice is removed and frequently takes with it portions of dead tissue. The skin is then carefully dried, the ointment spread upon soft lint and applied twice a day, or varying according to the severity of the case until the sore, etc., is healed.

PHARMACEUTICAL NOTES.

Abstracts from Theses.

Vinum Ipecacuanhæ.—Leopold Peters, Ph. G., has examined specimens of wine of ipecac, purchased at 49 different stores, with the object of ascertaining the alcoholic strength of the preparation. The Pharmacopœia directs the menstruum to contain not less than 20 per cent. by weight of absolute alcohol. The process followed was evaporation of the alcohol and calculating the strength from the difference in specific gravity, as directed by the Pharmacopœia. The results are placed in four groups, namely about 1·06 per cent. of alcohol in 9 specimens; about 3·71 per cent. in 16 specimens; 6·57 per cent. in 14 specimens, and 13·15 per cent. in 10 specimens. An alcoholic strength of between 12 and 15 per cent. by weight is considered to be sufficient for the preservation of this preparation.

Tinctura Avenæ sativæ.—Henry E. Heinitsh, Ph. G., has prepared the tincture from oats with the husks, from the husks alone, and from

the grain deprived of the husks. 4 troy ounces of the ground material were macerated and displaced with diluted alcohol, 5½ fluid ounces of the percolate were reserved, the remainder evaporated to an extract and this was dissolved in the reserved portion, sufficient diluted alcohol being added to obtain 6 fluid ounces. The first two tinctures yielded 3 per cent. of extract, while 3½ per cent. were obtained from the tincture of the grain.

Pharmacopœial Syrups.—J. Lewis Nebinger, Ph. G., after experimenting with a number of syrups, suggests the following modifications of the officinal formulas.

Syrupus Acaciæ.—The process of 1870 is far superior to the present one. The syrup should be made of select pieces of gum and in small quantities, and should be kept in a cool place.

Syrupus Ferri Iodidi.—Using the quantities directed by the Pharmacopœia, a syrup is first made of 300 parts of sugar and 150 parts of water, and transferred into a tared vessel. The solution of ferrous iodide is made with 150 parts of water and filtered into the syrup, followed by 25 parts of distilled water previously used for rinsing the flask in which the iron solution had been made. After the addition of 300 parts of sugar, solution is effected with the aid of heat, and enough distilled water is added to make 1,000 parts.

Syrupus Ipecacuanhæ.—Dilute 20 parts of fluid extract of ipecac with 133 parts of water, set aside for three days, filter and in the filtrate dissolve 247 parts of sugar without heat.

Solubility of Quinine Pills.—J. W. Pancoast, Ph. G., made a number of experiments to determine the conditions favoring the solution of quinine pills. Immersed in water at ordinary temperature for two days and without being agitated, compressed pills and sugar-coated pills seemed to be little altered; uncoated pills (formula and hardness not indicated) separated into a few fragments without dissolving, and gelatin coated pills became very soft. But when the pills were digested, with occasional agitation, in warm water or in acidulated water, or in a liquid imitating saliva, they were all dissolved, the time varying between thirty minutes and a few hours.

Pills of Potassium Permanganate.—Wm. M. Lewis, Ph. G., regards pipe clay as the most suitable excipient; but Sam. F. Stoll, Ph. G., believes cacao butter to be superior to all other excipients, which have been recommended for this salt. In preparing the pills a warm mortar is used in which the salt is powdered and, for every two grains of

it, incorporated with one-half a grain of cacao butter. The pills are very small.

Suppositories of Quinine, made with quinine sulphate, have sometimes produced irritation, which J. Addison Eberly, Ph. G., believes to be due to faulty manipulation. This is entirely avoided by triturating the salt with a small quantity of water until a perfectly smooth paste is obtained, then rubbing well with the cacao butter and moulding in the manner directed by the Pharmacopœia. Bisulphate of quinine does not yield satisfactory suppositories by dissolving the salt in a small quantity of water; they are best prepared by rubbing the crystals with a little olive oil to a smooth pasty mass, incorporating this with the cacao butter and moulding.

Suppositories of Carbolic Acid will be free from small globules of phenol and destitute of caustic properties, if the carbolic acid is dissolved in a portion of the cacao butter with the aid of heat.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Cocaine and Homologues.—The synthesis of cocaine was accomplished by Scraup (*Monatsh. d. Chem.*, 1885, 561), by heating in a sealed tube benzoyl-ecgonine, sodium methylate and methyl iodide; but the yield was only about 4 per cent.. W. Merck (*Ber. D. Ch. Ges.*, 1885, 2264), obtained about 80 per cent. of the theoretical quantity by heating in a sealed tube a mixture of benzoyl-ecgonine, methyl iodide and a little methylic alcohol to 100° C., when hydriodate of cocaine was produced. An attempt to effect the synthesis more directly (*Ibid.*, p. 2953), by heating anhydrous ecgonine with benzoic anhydride and methyl iodide was successful, but the yield was very small. By following the preceding process but using ethyl iodide, Merck obtained a new base for which the name *cocethyline* is proposed. It has the composition $C_{18}H_{23}NO_4$, and crystallizes from ether in colorless radiating prisms, and from alcohol in glossy prisms, which melt at 108°–109° C. The yellow precipitate with platinic chloride crystallizes from much hot water in the presence of some alcohol in splendid shining yellow rhombic scales. Auric chloride gives a yellow voluminous precipitate, and mercuric chloride a white pulverulent one, soluble in hot water. The alkaloid is sparingly soluble in alkalies and alkali carbonates. Prof. Falck has ascertained that coce-

thyline has an anæsthetic action similar to cocaine. The author intends to investigate other homologous alkaloids.

Poisoning by Bryonia.—Dr. C. Dickson reports (*Austral. Med. Gaz.*), a case of poisoning by the homœopathic tincture, which is made from the expressed juice of bryonia root, mixed with an equal bulk of alcohol. 80 minims were taken, producing symptoms resembling those from excessive doses of veratrum. The treatment consisted in giving stimulants like ammonia, coffee, and amyl nitrite, and in applying heat to the extremities.

Myristica surinamensis, Roland.—C. L. Reimer and W. Will (*Ber. D. Ch. Ges.*, 1885, p. 2011), describes the fruit (seed?) as being of the size and shape of a cherry, and invested with a dark-gray ribbed and very fragile shell, enclosing a light brown hard kernel which is internally marbled white and brown; odor faint, aromatic; taste peculiar, somewhat resembling that of cocoanut oil. The shells weigh about 16 per cent., and the kernels yield with hot ether 73 per cent. of fat which is light brown-yellow, hard, crystalline, melts at 45° C., possesses a slight not disagreeable odor, and is readily soluble in ether, benzol and chloroform, but only partially so in petroleum benzin and hot alcohol, the latter solvents leaving 6·6 per cent. of a yellowish translucent caoutchouc-like substance. The fat now contains about 6·5 per cent. of free acid. It gives with strong sulphuric acid a fuchsin-colored solution which gradually becomes colorless with the separation of brown flocks. The pure fat consists almost entirely of myristin and the free acid of myristic acid.

Myristica Bicuhyba, Schott.—The seeds have a black fragile testa with broad furrows, and a kernel resembling nutmegs in form, structure and size, and having an agreeable cacao-like odor, and a taste resembling that of butter of cacao, somewhat suet-like and with a bitter after-taste. The kernel is readily scratched with the finger-nail, and by trituration in a mortar is easily converted into a soft mass. H. Noerdlinger (*Ber. D. Ch. Ges.*, 1885, 2617), determined the seeds to contain water 6 per cent., and fat 59·6 per cent.; the shells constitute 15·5 per cent. of the weight and contain 11·2 water and 2 fat, while the dried kernels contain 73.7 fat. The crushed seeds subjected to hydraulic pressure yielded 47·56 per cent. of fat, and the press cake contained 8·86 water, 4·50 ash, 17·74 fat, 30·62 tissue, 17·62 protein and 20·66 non-nitrogenous extractive. The fat extracted by ether is light yellow, and its ethereal solution yields shining white

scaly crystals and a yellow oily mother-liquor. The expressed fat is yellowish-brown and the surface becomes covered with a white crystalline efflorescence; fused it is dark-brown and congeals with a wavy surface. The fat melts at 42·5° to 43° C. and congeals at 32° to 32·5° C. It is readily soluble in hot ether, petroleum benzin, carbon bisulphide and chloroform, and partly soluble in hot alcohol. The fat remaining in the press cake has a slightly higher melting and congealing point. The brown fat of the shells melts at 43° to 44° C. All these fats give with concentrated sulphuric acid a beautiful fuchsin-red color. The shells contain also a wax-like body melting at 74° to 75° C., and very sparingly soluble in hot ether.

Analysis showed the fat to consist of the glycerides of myristic and oleic acids, the former predominating; together with small quantities of resins, free myristic acid, little volatile oil (the stearopten is not identical with myristic acid), about 0·1 per cent. of non-saponifiable oil, and a brown coloring matter.

Peganum Harmala, Lin.—The alkaloid *harmaline*, $C_{13}H_{14}N_2O$, was isolated from the seeds by Goebel in 1837, and subsequently (1847) investigated by Fritzsche, who also discovered a second alkaloid harmine, $C_{13}H_{12}N_2O$. With the view of ascertaining their chemical constitution the two alkaloids have been farther studied by O. Fischer and E. Taeuber (*Ber. D. Chem. Ges.*, 1885, p. 400–406). Harmaline crystallizes from wood spirit in yellowish scales, melting with decomposition at 238° C., yielding colored strongly fluorescent salts, and on being warmed with strong sulphuric acid, giving a solution of harmalinsulphonic acid which after dilution with water exhibits a beautiful sky-blue fluorescence. Treated with fuming hydrochloric acid under pressure, crystalline *harmalol* is obtained, which is orange-red or brick-red, somewhat soluble in water, and in this solution shows a magnificent green fluorescence; it is probably identical with the yellow coloring matter contained in the seeds. By the oxidation of harmaline with nitric acid, harmine is formed, but the latter could not be converted into the former by reducing agents. Harmine crystallizes in colorless needles, melts with partial decomposition at 256° C., and is partly sublimable; its colorless salts show in diluted solution indigo-blue fluorescence. Treatment with fuming hydrochloric acid converts it into a phenol, *harmol*, which in acid solution has a violet fluorescence. By oxidation with chromic acid *harminic acid* $C_{10}H_8N_2O_4$ is obtained in silky needles.

Pipitzahoic acid (see *Amer. Jour. Phar.*, 1884, pp. 185, 193), according to F. Mylius (*Annalen*, xcv, p. 188, and *Ber. D. Chem. Ges.*, 1885, p. 936), is not a true acid, but a hydroquinone containing the group C_9H_{17}, and should be called *perezone*. Its compound with aniline, *anilidoperezone*, crystallizes from hot alcohol in blue needles, melts at 138° C., is insoluble in water, sparingly soluble in alcohol and in alkalies, but freely soluble in carbon disulphide, petroleum benzin, benzol, ether, chloroform and glacial acetic acid; the solution in strong sulphuric acid is dark-blue and on heating becomes cherry-red and yellow. By heating this compound with dilute sulphuric acid *hydroxyperezone*, $C_{15}H_{20}O_4$, is obtained, which crystallizes in glossy reddish-yellow scales, is freely soluble in alcohol, chloroform, benzol and glacial acetic acid, is a feeble acid, and dissolves in strong sulphuric acid with a cherry-red color, changing to yellow on heating, with the formation of *perezinone*, $C_{15}H_{18}O_3$.

A number of other derivatives were prepared by the author, also by R. Anschütz and W. Leather (*Ber. D. Chem. Ges.*, 1885, 715). Anschütz (*Ibid.*, p. 709), agrees with Mylius in regarding the natural product as a hydroquinone. The melting points of the acid and derivatives were lower than those ascertained by Mylius. The aniline-derivative is sublimable in steel-blue needles.

El Bethina, a Datura of the Sahara, is described by Mr. Bousson, pharmacien-major (*Arch. Méd. et Phar. Mil.*), who reports a number of cases of poisoning by the leaves. Complete prostration is produced, which after a long sleep may pass off without leaving any serious effects. Larger doses produce delirium with great thirst and ultimately death. The Arabs use as an antidote a mixture of dates triturated with water, and a sauce containing a considerable quantity of pepper (felfel) and butter. The remedy, taken freely by the patient, produces much sweating, and after twelve hours the patient is out of danger, without having experienced any hallucinations.

Fabiana imbricata, Ruiz et Pavon; nat. ord. Solanaceæ, is a Chilian shrub, about 15 feet high, with numerous branches, small imbricate leaves and purplish-colored flowers. In its native country it is known as *pichi*, and has been employed for a long time in various diseases of the urinary organs and also in certain diseases of the sheep and goat. Dr. A. Rodiguez (*Diario Med. Farmac.*) has recently called attention to this plant as being valuable in catarrh of the bladder from lithiasis, in certain liver affections and in dropsy. Its strong odor

is due to a volatile oil, and it is said to contain also considerable resin and a fluorescent principle crystallizing in needles and resembling æsculin. Filhol (*Compt. rend.*, l.), determined the presence of crocin in Fabiana indica.

Asparagin in Hops.—Bungener and Fries have shown that hop contains about 1 per cent. of asparagin, the nitrogen of which is equal to 30 per cent. of the total nitrogen in hops.—*Chem. Ztg.*, 1885, No. 86; *Zeitsch. Brauw.*, No. 13.

Danais fragrans, Commerson; nat. ord. Rubiaceæ. The root of this plant, which is a climbing shrub of Madagascar, is in great repute there as a vulnerary and antiherpetic, and is employed also as a tonic and antiperiodic. Heckel and Schlagdenhauffen have recently examined it (*Compt. rend.*, ci, p. 955), and showed that Bourdon's supposed alkaloid danaidine is calcium sulphate; but they isolated a greenish-brown glucoside *danain*, which is soluble in alcohol, acetone and hot water, and less freely soluble in chloroform, ether and cold water. It dies fabrics, is precipitated by lead acetates and seems to represent the medicinal properties of the root.

Test for olive oil.—Audoynaud recommends (*Rép. de Phar.*, 1885, p. 498), agitating 2 c.c. of the oil with 0·1 gm. of powdered potassium bichromate; after a few minutes sufficient nitroso-sulphuric acid to make 4 c.c. is added and the brown-red mixture agitated; on the addition of 1 c.c. of ether pure olive oil rises to the surface with a green color. In the presence of 5 per cent. or more of the oils of sesame, ground-nut, cotton seed or poppy seed, the color of the oily layer varies from yellowish-green to yellow or reddish-yellow; the addition of water makes the color more apparent.

Coloring Matter of Cochineal.—W. Will and H. Leymann (*Ber. D. Chem. Ges.*, 1885, p. 3180–3193), obtained from 5 kilos of silver-gray cochineal between 400 and 500 gm. of pure carmine-red. Dissolved in 50 per cent. acetic acid and boiled with excess of bromine, colorless needles of $C_{10}H_4Br_4O_3$, are obtained, which are insoluble in water, readily soluble in alkalies, and sparingly soluble in hot alcohol, benzol or glacial acetic acid. The acetic mother-liquor yields with water yellow amorphous floccules, readily soluble in alcohol, benzol and ether, and yielding, on boiling with concentrated potassa solution, a red pulverulent salt, the acid of which, when liberated, crystallized in yellow glossy needles, having the composition $C_{11}H_5Br_3O_4$, and which has no tinctorial properties; but all its salts are strongly colored.

On treating the alkali solution with stannous chloride, and then supersaturating with hydrochloric acid, ether will extract a substance, the solution of which on exposure to the air, acquires a color similar to that of a cochineal solution, and like the latter becoming violet-red on the addition of alkali.

Lanolin is a cholesterin fat which may be obtained from keratin-holding tissues, such as sheep's wool, hair, feathers, skin and hoofs of horses. Dr. Oscar Liebreich (*Berl. Klin. Wochenschr.*, 1885, No. 47), recommends it as a base for ointments superior to glycerin-fats and paraffins, since it is capable of taking up its bulk of water, is with difficulty decomposed and is very readily absorbed. Its presence is easily ascertained by Liebemann's test, the solution in acetic anhydride acquiring on the addition of concentrated sulphuric acid, a rose color changing rapidly to deep blue and green. A 5 per cent. carbolic acid ointment made with lanolin, produced in one or two minutes a feeling of numbness without irritation, and an ointment containing $\frac{1}{1000}$ corrosive sublimate will give the characteristic metallic taste a few minutes after inunction. The proper consistence of the ointments is best preserved by the addition of 5 or 10 per cent. of fat or of glycerin.

American Petroleum, according to C. Engler, contains a little over 0·2 per cent. of *pseudo-cumol* and *mesitylene*. The two hydrocarbons are also present in Caucasian petroleum, and it is very probable that cumols and other homologues of benzol are present in all rock oils.—*Ber. D. Chem. Ges.*, 1885, p. 2234.

Aseptol, according to a report by Mr. Anneessens, is freely soluble in water, glycerin and alcohol, is far less caustic than phenol, and in its disinfectant and antiputrescent properties is superior to salicylic acid or phenol; it deserves therefore to be preferred to the latter as a prophylactic and disinfectant. (See also *Amer. Jour. Phar.*, 1884, p. 647).

Formic acid is recommended by Dr. Schulz (*D. Med. Wochenschr.*) as a valuable antiseptic, which in very weak solutions effectually prevents the decomposition of organic substances.

Roasted Coffee is highly recommended by Dr. Oppler (*Nouv. Rem.*) as an antiseptic dressing for wounds, for destroying the odor of twice, or even four or five times its weight of iodoform, and for disguising the taste of castor oil. These valuable effects are attributed to the charcoal and the aromatic decomposition products, formed during the roasting of coffee.

Naphthalin is a good antiseptic, and when applied to ulcers causes the rapid disappearance of any offensive odor. Being non-irritant, its application is painless; moreover, it induces rapid healing and cicatrization of the ulcers.—*L'Union Méd.*, Dec. 12, 1885.

Hydronaphthol, a derivative of naphthalin, according to Dr. G. R. Fowler, is a more efficacious antiseptic than carbolic acid. It crystallizes in silvery white or grayish laminæ, has a slight aromatic odor and taste, is not irritating or poisonous, does not volatilize at ordinary temperature, but sublimes at about 90° C., is soluble in about 1,000 parts of water and dissolves freely in alcohol, ether, chloroform, glycerin, benzol and fixed oils. Its compounds with alkalies and alkaline earths are readily decomposed by carbonic acid. The saturated aqueous solution will perfectly preserve for an indefinite time animal tissues and fluids; when volatilized for purposes of fumigation the vapor of hydronaphthol has no obnoxious effect upon the organs of respiration, nor will it injure textile fabrics. The powder mixed with 50 times its weight of magnesium carbonate, fuller's earth or kaolin may be dusted on wounds and drainage tubes; and absorbent gauze, cotton, jute, wood flour, sawdust, etc., may be impregnated with it by means of the alcoholic or benzol solution. The 10 per cent. alcoholic solution perfectly sterilizes, and sufficiently hardens and preserves catgut.—*N. Y. Med. Jour.*, Oct. 3, 1885.

Essence of Lemon.—By G. Bouchardat and J. Lafont (*Compt. rend.*, ci, 383–385).—The authors have carefully fractionated essence of lemon and examined the products obtained by the action of dry hydrogen chloride on the different fractions. In most cases distillation was conducted under reduced pressure. The results lead to the conclusion that essence of lemon is a highly complex substance consisting mainly of hydrocarbons of the composition $C_{10}H_{16}$, and a little cymene. The most abundant of the $C_{10}H_{16}$ hydrocarbons is a citrene, which boils at about 178°, has a rotary power higher than + 105°, and yields directly a solid inactive dihydrochloride. The essence also contains small quantities of several terebenthenes, which begin to boil below 162°, and yield monohydrochlorides differing from one another in their rotatory powers.—*Jour. Chem. Soc.*, 1885.

ANALYSIS OF SAM-SHU, A CHINESE LIQUOR.

By Charles E. Munsell, Ph.D.

The liquor known as *toddy*, *arrack*, *saki*, *tsin*, and by other names in Eastern Asia, is distilled from the yeasty liquor in which boiled rice has fermented for many days under pressure. Only one distillation is made for common liquor, but when greater strength is desired two or three distillations are made; and it is this strong spirit alone which is rightly called *Sam-shu*, a word meaning "thrice fired." (The Middle Kingdom: S. Wells Williams. New York, 1883. Vol. I, p. 808.)

This liquid, which has the color of rich sherry wine, is imported in large quantities and is sold here (New York City) in the shops of Mott and Pell streets to Chinamen, who are very fond of it, not only for drinking but for preparing their opium for smoking. It is not agreeable to the taste of Caucasians, as it tastes and smells like spoiled Jamaica rum. Hitherto the proprietors of the Chinese shops, where it is retailed, have refused to take out licenses, because they did not consider the liquid intoxicating; in consequence of this refusal a sample was sent to the Health Department by the Excise Commissioners, with a request for its analysis. The results of this analysis are as follows:

Specific Gravity at 18° C.		94·84
Percentage of Alcohol, by weight		33·81
" " " " volume		45·70
" " Saccharose	5·39	
" " Glucose	1·19	
" " Mineral constituents	·06	
" " other Organic Solids	2·80	
" " Total Solids		9·44

Dr. J. P. Battershall, of the United States Laboratory, Port of New York, obtained the following percentages of Absolute Alcohol in samples of this "Chinese Medicine":

	Volume.	Weight.
No. 1	44·50	37·50
No. 2	33·10	27·27
No. 3	52·00	44·42

These analyses show that *Sam-shu* contains as much alcohol as any liquor usually sold.—*Jour. Am. Chem. Soc.*, 1885, p. 243.

THE ALBUMINOÏDS OF MILK.

By A. Dogiel.

1. *Peptones.*—As a result of his investigation of cow's milk, Schmidt-Mülheim states that it contains peptones, the proportion varying from 0·08 to 0·19 per cent. of the milk (*Pflüger's Archiv*, 28, 287). Hofmeister, on the other hand, denies that they are present, and in human milk likewise (*Zeits. physiol. Chem.*, 2, 288). In further investigating this question, the author sought first to ascertain the probable error inherent in the method of isolating the peptones. For this purpose known quantities of peptones were added, and the milk was then treated with ferric chloride solution in the usual way for the separation of other proteïds; the peptones were estimated in the filtrate by means of a comparative colorimetric determination based on the biuret reaction. In 19 experiments in which 40 c.c. of milk were taken for each, the quantities of peptones added varied from 0·004 to 0·020 gram, and the solutions finally obtained, after precipitation and washing, amounted to 190—250 c.c. The ultimate result was to show that the quantity of peptone retained by the precipitate was independent of the amount added, the quantity lost being approximately 0·005 in each experiment, that is, 0·0023 for every 100 c.c. solution ultimately obtained. That the peptone is retained by the precipitate is proved, according to the author, by the diminished loss which is noted when the iron oxide precipitate is boiled with water, and this aqueous extract added to the solution. By varying the quantity of milk, it was found that the loss of peptone remained equally uninfluenced.

On the basis of the experience of these blank experiments, the author proceeded to the examination of normal specimens of cow's and woman's milk, adopting special precautions in the isolation by precipitation of the peptones presumed to be present. In all cases, however, negative results were obtained. Having further repeated Schmidt-Mülheim's experiments (*loc. cit.*), and found that the substance supposed by him to be a peptone is a residue merely of one of the normal proteïds of milk, the author finally concludes that these milks do not contain peptones.

2. *Caseïns.*—The author has isolated, with special precautions, the caseïns from woman's and from cow's milk for the purpose of instituting a comparison of their properties. Having found that their reac-

tions were substantially identical, he examined the products of their artificial (peptic) digestion, which proved to be identical also, and there can be no doubt therefore that they are, chemically, very closely related.

3. *Other Proteïds.*—In a comparative examination of the products of peptic digestion of the two milks, by the optical method, the author found the rotation to be 50 per cent. greater in the case of the products from woman's milk, whence he concludes that in regard to the proteïds, not peptones, the two milks are differently composed. He suggests that the difference may be chiefly in respect of the lactoalbuminoïd recently described by Sebelien (*ibid.*, 9, 403).—*Jour. Chem. Soc.*, 1885, p. 1149; *Zeits. physiol. Chem.*, IX., 591.

SPURIOUS CUBEBS.

By William Elborne,

Assistant Lecturer on Materia Medica and Pharmacy, Owens College, and

H. Wilson.

(Read before the British Pharmaceutical Conference.)

In a paper[1] recently published in the *Pharmaceutical Journal* on this subject, Mr. E. M. Holmes has drawn attention to the recent adulteration of cubebs with an obnoxious piperaceous fruit referred by Mr. W. Kirkby[2] to *Piper crassipes?*, and the lauraceous berries of *Daphnidium Cubeba.*[3]

The following are the leading characteristics of these fruits as compared with the genuine drug.

Piper crassipes?	*Daphnidium Cubeba.*
Slightly larger, of a lighter color, the persistent stalk more flattened. Taste bitter, odor resembling mace. Microscopically it differs in having ten rows of cells in the endocarp instead of four.[4]	Same size as cubebs. Stalk articulated, usually absent. Contains no starch. Taste, faintly like oil of lemon—afterwards bitter.

In the same paper Mr. Holmes has also given good practical tests whereby these adulterants may be readily detected in cubebs occurring in the form of powder, founded upon the blue coloration yielded by

[1] *Phar. Jour.*, [3], xv, p. 909; *Am. Jour. Phar.*, 1885, 302.

[2] *Phar. Jour.*, [3], xv, p. 653; *Am. Jour. Phar.*, 1885, 353.

[3] Figured in Hanbury's "Science Papers," p. 247.

[4] Kirkby, *loc. cit.*

the decoctions upon treatment with iodine, due to the presence of starch, and the color reactions afforded by the respective powders upon treatment with strong sulphuric acid.[5]

With the limited time at our command, the object of the authors has been to carry the subject a stage further by more closely examining the character of the obnoxious adulterant to which may evidently be attributed the ill effects described by Dr. Buxton Shillitoe,[6] viz, the fruits of *Piper crassipes?*

I. Two grams of the powder upon incineration yielded a residue of ·175 gm., corresponding to 8·75 per cent. of ash.

II. Ten grams of the powder were macerated in 100 c.c. of petroleum ether for five days. Five c.c. poured off and evaporated in a current of air free from moisture,[7] left an oleo-resinous residue weighing ·077 gm.

III. Five grams of the powder were mixed with water, distilled, and the distillate shaken with petroleum ether; the ethereal solution decanted and evaporated in a current of dry air yielded a residue of ·56 gm., corresponding to 11·5 per cent. of volatile oil, which possessed an agreeable odor resembling a mixture of turpentine, oil of lavender and oil of peppermint.

IV. The washed and dried marc from II. was macerated for five days in ether. Ten c.c. of the ethereal solution upon evaporation to dryness yielded a residue of ·05 gm., corresponding together with the resin extracted in II. to 8·5 per cent.

This residue was soluble in absolute alcohol, and other portions boiled with a small quantity of distilled water, yielded a solution which copiously reduced Fehling's solution, and was not affected by either ferric chloride or Mayer's solution; it possessed a very bitter taste resembling quassia, and a few drops treated with strong sulphuric acid upon a white tile yielded a brown color.

Thereupon three ethereal tinctures of the fruits of *Piper Cubeba*, *Piper crassipes* and *Daphnidium Cubeba* were prepared by macerating 20 gms. of the finely powdered drugs in 50 c.c. of ether respectively for forty-eight hours, and 10 c.c. of each exposed to a current of dry air for twenty-four hours at the ordinary temperature.

[5] For the color reactions afforded by the respective tinctures, see Mr. E. D. Gravill's paper (*Phar. Jour.*, [3], xv, p. 1005).

[6] *Lancet*, May 2, 1885, p. 829.

[7] Osse's method (*Year-book of Pharmacy*, 1876, p. 362).

The following remarks apply to the residue obtained:

	Piper Cubeba.	*Piper crassipes.*	*Daphnidium Cubeba.*
Character of residue.	Oleo-resinous, dull yellow color.	Oleo-resinous, olive-green color.	Fatty, brown color.
The filtered solution obtained after boiling the residue with 10 c.c. of water.	Colorless, free from bitterness; sparingly reduced Fehling's solution.	Colorless, very bitter, like quassia; copiously reduced Fehling's solution.	Colorless, very bitter; sparingly reduced Fehling's solution.
A few drops of the above solution treated with H_2SO_4 upon a white tile.	Developed a crimson color (characteristic of cubebin).	Developed a brown color.	No change.
Portion of original residue treated on a white tile with H_2SO_4.	Crimson.	Brown.	Brown.
With $H_2SO_4 + HNO_3$.	Crimson, changing to violet.	Green, fading to yellow.	Brown.

V. The marc from IV. washed and dried was macerated in 100 c.c. absolute alcohol for five days. Five c.c. evaporated to dryness in a water-oven yielded a residue of ·015 gm., corresponding to 3·0 per cent.

VI. The marc from V., washed and dried, was macerated in 100 c.c. of distilled water for five days. Ten c.c. evaporated to dryness as above yielded a residue of ·16 gm., corresponding to 16 per cent.

Ten c.c. mixed with 20 c.c. absolute alcohol, set aside for twenty-four hours, the precipitate collected, washed and dried, weighed ·1 gm., corresponding to 10 per cent. mucilaginous matters.

From the above experiments the spurious cubebs under investigation are free from tannin, and contain essential oil, resin, and a very bitter glucoside, but to which of the two latter the deleterious effects already recorded may be attributed remains a subject for physiological experiment. In conclusion, the authors are of opinion that this species agrees entirely with that described by Flückiger and Hanbury,[8] and may be definitely referred to *Piper crassipes.*—*Phar. Jour. and Trans.*, Dec. 12, 1885.

Compound Fluid Extract of Buchu.—The following formula which has been used by Dr. H. H. Stinson, for ten years, with excellent results, is recommended: Buchu 16 troy ounces, uva ursi, cubeb and juniper berries, of each 4 troy ounces; prepare in the usual manner 28 fluid ounces of fluid extract, using 95 per cent. alcohol for the menstruum.—*N. E. Med. Monthly*, December, 1885, p. 27.

[8] *Pharmacographia*, p. 588.

CAMPHOR OIL.

It will be remembered that Mr. MacEwan, in a paper printed in *Phar. Jour. and Trans.*, June 20, 1885, and in *Am. Jour. Phar.*, 1885, p. 406, stated that Japanese camphor oil does not contain camphor, a conclusion which he arrived at by freezing a sample of the oil and distilling at a high temperature, whereby he failed to obtain any separation of camphor. Mr. Moss, on the other hand, showed, in a paper read at the Aberdeen Conference, that though the ordinary oil varies considerably, many cases of it contain separated camphor when received here in the winter months, though not in summer, and that a considerable quantity of camphor is obtained by distilling below 407° F. (208° C.). In the discussion which followed Mr. Moss's paper the wish was expressed for a further and more complete research. This wish is in a great measure met by the researches of Mr. Kikorokuro Yoshida, the results of which are recorded in a communication from the Chemical Society of Tokio (*Jour. Chem. Soc.*, October, 1885. p. 779). The specimens examined by Mr. Yoshida were an oil five years old and one more recent but of uncertain age; both deposited some camphor on freezing, the older more abundantly than the other. It is not stated whether these specimens were separately examined as to their chemical constituents, but the value of the facts brought out by the research is not diminished on this account, since it is already known that old samples of camphor oil contain more camphor than recent samples. By distilling the five years old oil into sixty-five fractions, Yoshida finally separated these into five portions:

1.	Boiling below 145° C.	0·2 per cent.
2.	A hydrocarbon, b. p. 156°	7·0 "
3.	" " " b. p. 172°–173°	20·0 "
4.	Camphor, b. p. 205°	22·8 "
5.	An oxygenated oil. b. p. 212°–213°	50·0 "
		1000·0

Fraction 1 was obtained in too small quantity for examination; it was an oily hydrocarbon. The second fraction, rectified over sodium, was found on examination to be *terebinthene* ($C_{10}H_{16}$), identical chemically, but differing physically from that yielded by turpentine. It yielded a hydrochloride, dihydrochloride and the nitrochloride of Tilden and Shenstone. The specific gravity of the terebinthene at 15° C. was 0·8641, and rotatory power $[a]j$–76.1°. The third fraction

is a terpene hydrocarbon of pleasant lemon odor ; it is probably identical with the citrene of lemon oil, and, like hesperidene of the orange, yields a camphor-like body ($C_{10}H_{16}O$) when oxidized with chromic acid. It differs from lemon oil citrene in not yielding *terpin* on oxidation with nitric acid, and also in its rotatory power (–68·3°). Passing over the camphor, the author found in the fifth fraction a new body, the existence of which in the oil is directly connected with the formation of camphor. In the first instance this was the portion of oil boiling at 208–218° C., but finally it was reduced to a fraction boiling at 212–213° C., and would only be obtained pure by cooling to –30° C., in order to completely separate the camphor from it. On again distilling this pure product the author obtained 5·6 per cent. of camphor, and a second redistillation afforded 4·9 per cent. more. Returning to the examination of the camphor-free oil, he found that by boiling it for six hours much camphor was found, but that a temperature of 100° C. does not have this effect. Previously he had determined that the oil absorbed 8 per cent. by volume of oxygen in the course of a month, camphor being formed simultaneously. He, therefore, concludes that the formation of camphor by ageing of the oil or by boiling is due to the presence of this oxygenated oil. He names it, provisionally, *camphorogenol* [or camphor hydrate ($C_{10}H_{16}O$, H_2O)]. It is a colorless, heavy oil of specific gravity 0·9794 at 20° C., has a pleasant camphoraceous odor, milder, however, than that of camphor. It is soluble in alcohol, ether and bisulphide of carbon, but insoluble in water. Warmed with dilute nitric acid (1 to 20 of water) it yields a large quantity of camphor and a yellow oil, from which more camphor may be obtained by freezing. Boiling chromic acid mixture has a similar effect. Benzoic acid and glacial acetic acid failed to act upon the body, thus proving its non-alcoholic nature ; but strong nitric acid acts upon it, camphoric acid and cymene being amongst the products. By acting on the alcoholic solution of camphorogenol with sodium, *camphol* (borneol) is produced. The body, therefore, forms a connecting link between camphor and camphol. The author obtained 7 per cent. of camphor from an artificial camphor oil composed of 55 of camphorogenol, 30 of citrene and 17 of terebinthene, by heating it in presence of air for ten days on a water-bath, but failed to get any camphor from a mixture of citrene and terebinthene alone. Simultaneously with the production of camphor, a part of the camphorogenol is, in all cases, poly-

merized into a dark oil. Various details of great interest are contained in the paper, but these cannot here be produced in an intelligible way. To pharmacists the publication of Mr. Yoshida's results is at the present time peculiarly opportune, but this circumstance is of small value compared to the important effect which it will have upon the camphor industry. There are indications that the camphor forest are suffering to a degree not far short of devastation, and, as a tree is not fit for camphor-making until it is nearly two centuries old, it is necessary that the most should be made of present resources. We understand that very large stocks of camphor oil are held in this country, different samples varying greatly in their characteristics, as was pointed out by Mr. Moss. It is possible that the dark oils are nothing else than the residuum containing polymerized camphorogenol. The lighter oils, on the other hand, generally exhibit a preponderance of the lower boiling bodies. We understand that several pharmacists are engaged in the examination of commercial supplies; it is desirable that they should pursue their researches to the determination of what oils are useful and what are not, from a medicinal point of view, camphor and camphorogenol being taken as the basis of value. It is obvious, also, that oils which contain the maximum of terebinthene and citrene, will be best adapted for varnish making.—*Phar. Jour. and Trans.*, Nov. 21, 1885.

GLEANINGS FROM FOREIGN JOURNALS.

By George H. Ochse, Ph.G.

Lanolin.—Under the name of Lanolin, Prof. Liebreich introduced the fat obtained from sheep-wool. One of its properties is to take up more than its own weight of water. Unna states that cooling ointments should contain large quantities of water. Dieterich, with a view of determining the quantity of water taken up by different salve bases, experimented with 21 different bases at a temperature of 15° C., taking for each experiment 100 parts of the base; his results were as follows: Cosmoline took up 4 parts of water, lard 15, benzoinated lard 17, and lanolin 105. The remaining bases were mixtures of either almond oil, olive oil, linseed oil, cod liver oil, or oleic acid with either lard, wax, resin, suet, or spermaceti. White wax took up more water than yellow wax, probably due to the acid it contains. A mixture of 70 parts of oleic acid and 30 parts of white

wax took up 60 parts of water, whilst a mixture of yellow wax and oleic acid in the same proportions took up but 50·5 parts of water.

Lanolin, as it now appears in the market, is a perfectly neutral base and hence is not apt to decompose any medicament which might be added. Lassar experimented with it on 400 patients, and states that lanolin is readily absorbed by the skin, does not produce any irritation and permeates the lower layers. Bachmann rubbed a 10 per cent. iodide of potassium ointment, made with lanolin, into the skin for five minutes; after a lapse of half or three-quarters of an hour, iodine was detected in the urine. The elimination of the iodide by the urine continued for 14 days after several applications of the ointment. Lanolin was used by the ancients, and is mentioned by Ovid, Herodot, Plinius and Aristophanes. Under the name of œsypum it is mentioned in the Florentine pharmacopœia of 1560.—*Rundschau*, No. 52, p. 825.

Pure Cochineal Carmine is not entirely soluble in alcohol and water; water dissolves it sparingly, alcohol considerably. Instead of containing only traces of alumina and lime as is usually supposed, Liebermann states that it contains as much as 8 per cent.—*Rundschau*, No. 52, p. 835.

Hypnone—a new hypnotic.—Methyl-phenyl-acetone (methyl-benzoyl or acetophenone) has been used by Dr. Dujardin-Beaumetz as a hypnotic. He proposes to name it hypnone. Hypnone belongs to the aromatic group, formula $C_6H_5COCH_3$, and was obtained by Friedel by distilling a mixture of benzoate and acetate of calcium, also by the action of benzoyl chloride on zinc methylate. Hypnone is a mobile, colorless liquid, very refractory, boils at 198° C., volatile and has a persistent odor, recalling that of bitter almonds, or cherry-laurel water; it is not inflammable, but is an active supporter of combustion; at about 4° or 5° C. it becomes solid, forming large crystals. Its density is greater than water, 1 c.c. weighing about 1·6 gm. Hypnone is neutral to test-paper, very soluble in alcohol, ether, chloroform and benzin. It is very soluble in the oils, particularly expressed oil of almonds. When dropped from a bottle the drops are very small, 1 c.c. being equal to 39–40 drops. It is not affected by sulphuric or hydrochloric acid, nor by perchloride of iron; with nitric acid it produces a yellow coloration. Dose, 1 drop. —*Archives de Pharmacie*, i, p. 1.

Colorless Cement.—12·5 parts of cut, unvulcanized caoutchouc are

dissolved in 10 parts of chloroform and 2·5 parts of mastic added, allowed to stand for several days and shaken occasionally.—*Pharmaceutische Zeitschrift fuer Russland*, 1885, p. 756.

Cumol.—By heating 1 part of aluminium chloride with five parts of diphenylpropane, Silva obtained cumol, a considerable quantity of benzol and a tarry substance. Cumol thus obtained boils at 158°-160° C. Silva believes it to be the normal propyl-benzol.—*Chemiker Zeitung*, ix. p. 1770.

Preparation of Pure Oxalic Acid.—The method usually adopted for preparing chemically pure oxalic acid (crystallization from hot solution of oxalic acid in dilute muriatic acid) is tedious and entails considerable loss. Soltsien obtains pure oxalic acid by sublimation. Care must be taken to deprive the acid of its water of crystallization at a temperature not exceeding 85° C.; while still warm it is placed in a porcelain evaporating dish and covered with filtering paper, over the paper is placed a cone of filtering paper and a glass funnel. It is then heated on a sand-bath at a temperature below 150° C. Sublimated oxalic acid is hygroscopic. To prepare a normal solution it is of course advisable to keep in a dessicator with sulphuric acid or to recrystallize.—*Chemisch-technischer Central Anzeiger*, iv. p. 139.

Sulphate of Sparteine—a new remedy in heart affections.—Sparteine is an alkaloid obtained from Spartium scoparium. It is an oily liquid, decidedly alkaline, insoluble in water. Sparteine forms with sulphuric acid a crystallizable salt, soluble in water. Germain-Sée experimented with an aqueous solution of sulphate of sparteine—10 centigram doses produce a remarkable effect on the heart without disturbing digestion or influencing the nervous system. Germain-Sée employed it in a number of cases, and cites as the result of his experiments in cardiac affections, three characteristic effects. The first, which is the most important, is the quickening and renewed action of the heart and pulse, in this respect resembling digitalis or lily of the valley, but its action is more prompt and more durable. The second is the regulation of the disturbed heart rhythm, no other medicine can be compared with it for this purpose. The third is the acceleration of the heart beat. All these effects appear in about one hour or several hours at the most, and are maintained three or four days after the medicament has been taken. During this time the general strength is increased and respiration is quite easy. When the pulse is irregular, intermittent and arhythmic, sulphate of sparteine quickly re-estab-

lishes the normal type. When the circulation is slower the medicament appears to immediately obviate the functional trouble, maintaining and augmenting the acquired force of the heart muscle.—*Bulletin Général de Thérapeutique*, December, 1885, p. 528.

VARIETIES.

Fluid Extract of Salix Nigra, prepared from the inflorescence, is recommended by Dr. F. T. Paine, in drachm doses, for neuralgia and dysmenorrhœa of ovarian origin, in the treatment of masturbation.—*Med. Age.*

Bromhydrate of Quinine and Valerianate of Caffeine, combined in the proportion of fifteen grains of the former to eight grains of the latter, are regarded by Dr. Martinez Cereceda as frequently effectual in malarial fevers, which do not yield to the sulphate of quinine in much larger doses. The bromhydrate of quinine has a gradual sedative action upon the nervous system, does not irritate the stomach, and its use is followed by no ill effects.—*Med. News*, 1885; *Gaceta de los Hosp.*

Hypnone, a new hypnotic, is methylphenylacetone. It is the principal product, resulting from the dry distillation of calcium benzoate and acetate, and is formed also by the action of zinc methyl upon benzoyl chloride. It crystallizes in laminæ, and melts at 14° C., or, according to others, at 20.5° C.; it is nearly insoluble in water, slightly soluble in glycerin, readily soluble in alcohol and ether. Dujardin-Beaumetz states that it should be used only in cases of overexcitement of the brain and not where there is pain. The dose is four to ten drops, taken at once, since divided doses are not effectual. Vigier (*Gaz. hebd.*) suggests an *elixir*, prepared in the following proportion: hypnone 1 drop, alcohol (60 per cent.), and syrup of peppermint, of each 3 grams.

A Mixture of Animal Charcoal and Camphor, equal parts, is recommended by Barbocci as an application to prevent the offensive odor and remove the pain of old excavated ulcers.—*British Med. Jour.*

Chloroform as a Hæmostatic in minor surgical operations, especially in the mouth and throat, is recommended by Dr. Spaak; it is used in one per cent. aqueous solution.—*Wien Med. Blätter*, 1885, No. 41.

Alkaline Toothwash.—Vigier (*Gaz. hebd.*) recommends the following: Dissolve sodium bicarbonate 20 grams in distilled water 980, and add sufficient distilled spirit of peppermint. Triturate 20 drops of the best oil of peppermint with magnesium carbonate 2 grams, afterward with the above solution, gradually added, and filter.

Cauterizing Crayons are recommended by Moser (*L'Union Méd.*), to be prepared from charcoal 40, potassium nitrate 5, porphyrized iron 5, powdered benzoin 1, and sufficient mucilage. After drying, these crayons are firm, light easily and produce immediate cauterization.

Castor Oil for Removing Warts is recommended by Dr. S. C. Dumm (*Therap. Gaz.*, December, 1885); the application is made once a day, and must be continued for from two to four or six weeks.

Ointment of Mercuric Subsulphate, as a local application in certain syphilitic affections, is directed by Mauriac to be prepared of Turpeth mineral 2 to 3 parts and lard 30 parts.—*Med. News*, Jan. 2, 1886.

Poisoning from Caffeine.—Dr. E. N. Liel, reports a case of poisoning from eighteen grains of citrate of caffeine, which was relieved by hypodermic injections of atropine and drachm doses of whisky.—*N. Y. Med. Jour.*

Silica in a urinary sediment has been observed by Abonnel. The sediment was granular, the surface smooth, the angles rounded, and was hard enough to scratch porcelain; it consisted chiefly of silica, with small quantities of calcium oxalate and uric acid.—*Lyon Méd.*, June 21, 1885.

MINUTES OF THE PHARMACEUTICAL MEETING.

Philadelphia, January 19th, 1886.

The meeting was called to order by the actuary, and Mr. Robert England was elected chairman.

The minutes of the last meeting were read, and, there being no corrections to make, they stand approved.

The actuary presented the following books for the library, viz.: The Report of the Tennessee State Board of Health for 1880–84; The Report of the Illinois Board of Pharmacy for 1885; Weights, Measures, and Specific Gravity, by Oscar Oldberg; and Volume III of the Publications of the Bureau of Ethnology, by J. W. Powell, director, issued by the Smithsonian Institution. These were all accepted and directed to be placed in the library, and the thanks of the College were returned for them.

Mr. J. W. England read a paper upon the *manufacture of whiting* (see page 77) which was referred to the publication committee.

A paper describing *Heeren's milk tester*, an instrument designed to determine the richness of milk; and a paper upon *Maury's ointment*, the formula not being generally accessible, were read and referred to the publication committee.

Messrs. Mellor & Rittenhouse presented to the cabinet, through Prof. Maisch, a specimen of Turkey *Licorice Root*, consisting of the upper portion of a very large main root of Glycyrrhiza glandulifera, which is now generally regarded as a variety of Glyc. glabra. Specimens of the fruit of the same plant were also presented. This variety is extensively cultivated in Asia Minor and Syria, and is the source of the Russian licorice-root of commerce, which was formerly supposed to be procured from Glyc. echinata.

Mr. G. W. Kennedy of Pottsville sent to the cabinet a specimen of *coal* which shows the colors of the rainbow so strongly that it may well be termed beautiful.

Mr. Lehr, of the present junior class, presented some specimens of petrifacts, from the Lykins Valley coal mines, bearing very distinct impressions of leaves, ferns, &c.

Prof. Sadtler gave a very interesting and instructive account of the manufacture of *Celluloid* illustrated by a large number of specimens of the crude material and of the finished products. This material was originally discovered by an Englishman named Parkes, in 1865, and by him named parkesine. His first experiments were made by treating pyroxylin with different solvents of a liquid character; among them mineral and wood naphthas and glacial acetic acid, to which camphor was added. In 1868 a medal was given him at the Paris Exposition, but as he failed to make it a commercial success, it dropped out of use. In 1870 the Brothers Hyatt, then of Albany, found that the solvent best adapted to the purpose was camphor heated to the melting point; when pyroxylin is comminuted and thoroughly mixed with the melted camphor it becomes a plastic, homogeneous solid, capable of being moulded into almost any form. The principal company, located at Newark, N. J., devote their energies to developing new uses for the crude material, while the finishing of different smaller articles is left for the companies licensed by the proprietors of the process. Among the different uses it has been applied to, the manufacture of keys for pianofortes and organs is a very extensive one; about 80 per cent. of the instruments being supplied with keys from this source, it being preferable to ivory as it retains its whiteness much longer. While in the plastic state celuloid may be colored and stratified so as to imitate agate, cornelian and other precious stones. It is capable of being drawn out into filaments, resembling wire, and of being rolled out into thin transparent sheets, and, as it is very light, it is preferable to vulcanite, for many purposes; in making plates for artificial teeth, the very small amount of cinnabar required to color it, removes the danger of the injurious mercurial effect which is complained of when vulcanite is used for that purpose. It has been applied to various kinds of fabrics, being preferable to oil cloth, as it is not liable to crack. As a surfacing for wood it is superior to varnish, not being affected by moisture. Its elasticity and toughness make it very serviceable for watch dials, billiard balls, combs and brush-stocks, while the finish, which the material is capable of receiving, renders it probable that its use will be extended constantly.

Mr. Bullock, the president of the College, sent to the meeting a *horn scoop*, which had been left in a box along with some worm-eaten coriander seeds; the insects having satiated themselves with the seeds, turned to the horn scoop, the surface and edges of which they had completely destroyed.

Some samples of *sandballs*, called by the quarrymen *bombshells*, because they explode under certain conditions, were exhibited and presented by Mr. Bullock.

Prof. Sadtler alluded to the new apparatus which had just been imported for the use of the College, and said that he had hoped to have it exhibited, but owing to the bad packing, it was somewhat injured and would require repairing before being used.

Mr. Procter inquired whether any of the members had found any *sugar* that was free from ultramarine. This elicited a statement from several members that, while much of the sugar of commerce was so doctored and in some instances so badly as to be productive of serious annoyance, yet sugar free from artificial coloring could be obtained.

There being no further business, a motion to adjourn was carried.

T. S. Wiegand, *Registrar.*

EDITORIAL DEPARTMENT.

College Attendance.—Of 289 students who are first matriculants at the Philadelphia College of Pharmacy, the following practical business experience was reported at the beginning of the lecture course :

Not over 3 months,	3	Not over 3 years,	58
" " 6 "	1	" " 3½ "	50
" " 9 "	3	" " 4 "	24
" " 12 "	3	" " 5 "	28
" " 15 "	10	" " 6 "	16
" " 18 "	4	" " 7 "	2
" " 21 "	13	" " 8 "	3
" " 2 years,	11	" " 10 "	1
" " 2½ "	58	" " 11 "	1

It will be observed that about 16 per cent. of the number had been engaged at the drug business for periods not exceeding two years, and of these only about 3 per cent. had an experience of one year or less. The average for the whole number is a little over three years, and over 57 per cent. of these matriculants had been in the drug business between two and three and a half years. It is evident from the above that only a very small number of the apprentices avail themselves of the theoretical instruction provided by the lectures in the early part of their pharmaceutical apprenticeship, a course which has been recommended and is followed by some of our best pharmacists. On the other hand, it will be noticed, on the perusal of the class-lists, that many students extend their studies over three years, in the place of two years, which are indispensable. Such a course deserves to be encouraged on the part of the employers; in fact, to a number of the young men an extension of their studies to four years would be quite profitable. It is too frequently the case that the importance of the junior course of studies is not appreciated as it should be, since it is preparatory to the senior course, for which a solid foundation must be laid. Many young men could most profitably spend two years in the former, and then, with ordinary but careful application, would the better be prepared for their senior studies. These remarks apply more particularly to such who, though quite proficient in the ordinary English branches, have not previously had any instruction in the elements of natural sciences, and who, aside from the practical, receive little or no theoretical instruction from their preceptors, but are frequently even left to select their reading at random. With constant work through the day, often till late in the evening, be it behind the counter or in the making of preparations, the fatigue is sufficient for preventing, or at least interfering with, systematic mental labor. Those who are thus situated would derive the greatest benefit from a division of their studies in such a manner as is contemplated by the modified courses, by which either the junior or senior course, or both, may be extended over two years.

Dr. V. Podwissotzki, whose labors in phytochemistry are well known, has accepted a call as Professor of Pharmacognosy and Pharmacy in the Imperial Russian University at Kazan. He entered upon his new field of labor during the present winter.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Text-book of Medical Chemistry for Medical and Pharmaceutical Students and Practitioners. By Elias H. Bartley, M. D., Adjunct Professor of Chemistry, and Lecturer on Diseases of Children in Long Island College Hospital, etc. With 40 illustrations. Philadelphia: P. Blakiston, Son & Co., 1885. 12mo, pp. 376. Price, $2.50.

This work is not solely devoted to medical chemistry as might be inferred from the title; but it embraces the elements of chemical science, giving, however, prominence to those elements, compounds and reactions which are of special interest or importance to the physician, while those matters which have no direct bearing upon medicine, as a rule, are disposed of in a concise manner. Viewed from this standpoint, the scope as well as the arrangement of the work has been judiciously accomplished, and it will doubtless be found useful for the medical student.

Part I. gives a condensed account of chemical physics, and Part II. discusses briefly but lucidly the general chemical theories. The descriptive chemistry is found in Parts III. and IV., of which the former contains over 150 pages devoted to inorganic chemistry, and the latter about 80 pages devoted to organic chemistry. In most cases the medical properties of the different substances are briefly mentioned, as well as an outline of the treatment in cases of poisoning. A short chapter on poisons and their antidotes is appended to Part IV. The appendix contains various tables, most of which are of especial usefulness to physicians, and a glossary, explaining the meaning of many antiquated terms and such which are rarely used, but also many which are in daily use.

The definitions given in the glossary in some cases will scarcely be considered as satisfactory to the chemist or pharmacist; thus milk of lime is defined as being "whitewash," and spirit of hartshorn is said to be a "solution of ammonia in alcohol." Similar inaccuracies are occasionally met with also in the text. On page 189 it is stated that an aqueous solution of potassium iodide dissolves iodine, forming the compound "tincture" of iodine. On page 112 chlorine is said to be made from sulphuric acid, sodium chloride and "manganic oxide." Picrotoxin and salicin (p. 299) are enumerated among the alkaloids, and cinchonine is stated to be "insoluble" in ether (p. 298). These and some other vague or incorrect statements will doubtless be corrected in a future edition.

The illustrations are mostly contained in the two first parts of the work. The apparatus figured on page 114 is well adapted for the preparation of chlorine water, but not for that of hydrochloric acid. The manufacture of flowers of sulphur on a large scale has been singled out for illustration (p. 120), while other far more important products have not been similarly honored, although many of them may be conveniently prepared on a small scale.

American Medicinal Plants; an illustrated and descriptive guide to American plants. By C. F. Millspaugh, M. D. New York and Philadelphia: Bœricke & Tafel. Nos. 11 to 15. Price, $5.00.

Of the thirty plants presented in this fascicle, eight are of foreign origin, but either cultivated or naturalized in the United States, namely: Agrostemma,

Hippocastanum, Conium, Lappa, Cichorium, Plantago major, Verbascum and Stramonium. With the exception of some details—for instance the stamens of Kalmia latifolia—the execution of the plates, including the coloring, is good, though some of the drawings, like Eupatorium purpureum, would show to better advantage if made of larger size. The botanical descriptions are in the main reliable. The chemistry of the plants is in several instances incorrectly or vaguely given; thus xanthoxylin is stated to be identical with berberine; Drosera rotundifolia is said to contain alizarin; the alkaloid of burdock fruit is mentioned in connection with the root, etc.

Drugs and Medicines of North America. Cincinnati: J. U. & C. G. Lloyd. 4°.

This quarterly has now closed its second year by the publication of the eighth number for December, 1885, which is almost wholly devoted to cimicifuga. In this article we note especially the investigations made by Prof. Warder with the fresh and dried drug, and by Prof. Coblentz with the precipitated resin, showing that a crystalline principle announced by Conard, Beach and Falck (*Am. Jour. Phar.*, 1871, 151; 1876, 151; 1884, 459), cannot be obtained by the processes published, and confirming the results of F. H. Trimble (*Ibid.*, 1878, 468), according to which the principle obtained is resin-like and amorphous.

The natural order of Ranunculaceæ will be concluded in the next issue of this periodial, which deserves to be in the hands of every pharmacist and physician on account of the excellent critical investigations and the full information on North American medicinal and allied plants given therein. The numerous wood-cuts form a very valuable addition.

Zum Hundertjæhrigen Geburtstag des Gründers der Firma Fridrich Jobst. Stuttgart, 1886.

To the one hundredth anniversary of the birthday of the founder of the firm of Fridrich Jobst.

This is a handsome octavo volume, giving the biography of Fr. Jobst, who was born January 2, 1786, and died September 13, 1859. It is published in six languages, German, French, Italian, English, Greek and Russian; and is embellished with a steel engraving of Mr. Jobst, and phototypes of the establishments in Stuttgart and Feuerbach. Very numerous and quite important investigations have been made in the laboratories of this firm during the last twenty-five years by Mr. Julius Jobst, a member of the firm, and by Dr. O. Hesse, the director of the laboratories in Feuerbach; the titles of these investigations which were published, occupy over two pages of the volume.

Henry Shaw School of Botany. Inaugural Exercises in Memorial Hall, St. Louis Museum of Fine Arts, November 6, 1885. 8vo, pp. 24.

This school was founded by Mr. Shaw, who donated improved real estate, yielding over $5000 revenue. The school is attached to the Washington University and has, for demonstration and investigation, the use of the Missouri Botanical Garden and Arboretum. Prof. Wm. Trelease, formerly of the University of Wisconsin, accepted the call for organizing and taking charge of the new school. The pamphlet before us contains his inaugural address. St. Louis may well be congratulated for this new institution, secured through the liberality of one of her citizens; also Prof. Trelease for the enlarged field of scientific labor thus opened to him.

Sketch of the Botanical Work of the Rev. Moses A. Curtis, A. M., D. D., F. A. A. S. By Thos. F. Wood. Raleigh, N. C., 1885. 8vo, pp. 31.

A very interesting sketch of the work done by this American botanist, whose portrait, a fine steel engraving, accompanies the pamphlet. Dr. Curtis was born in Massachusetts in 1808, and died in 1872. The paper was read before the Mitchell Society of the University of North Carolina.

Experiments with Diffusion and Carbonatation at Ottawa, Kansas, Campaign of 1885. By Harvey W. Wiley, Washington, D. C. 8vo, pp. 20.

The pamphlet is issued by the Department of Agriculture, and contains experiments on the manufacture of sugar from sorghum, made with the view of recovering a larger percentage of it than has hitherto been accomplished. This the author believes can be done after some difficulties, which are wholly mechanical, have been overcome.

Lectures on Syphilis. Delivered at the Chicago College of Physicians and Surgeons by G. Frank Lydston, M. D., etc., reported by Wm. A. Walker, A. M., M. D., Attending Physician to the West Side Dispensary. Chicago: A. M. Wood & Co., 1885, pp. 185. Price, $1.25.

After having been published in *The Western Medical Reporter*, these lectures have been collected for republication in their present convenient form. The aim of the lecturer has been to present a plain and practical idea of the whole subject of syphilis as at present taught, together with practical points drawn from personal observation in hospital and dispensary practice. The nomenclature used in the prescriptions given, although in general that of the U. S. Pharmacopœia, lacks uniformity; thus we have Sarsa and Sarsaparilla, Kalium and Potassium, etc.

An Experimental and Clinical Study of Air-Embolism. By N. Senn, M. D., of Milwaukee, Wis., etc. Philadelphia: Collins, Printer, 1886. 8vo, pp. 121.

A reprint from the Transactions of the American Surgical Association, vol. iii, 1886.

Transactions of the American Dermatological Association at the ninth annual meeting held at Indian Harbor Hotel, Greenwich, Conn., August 26 to 28, 1885. Official Report of the Proceedings by the secretary, W. T. Alexander, A. M., M. D. New York: 1885, 8vo, pp. 47.

Leçons sur l'étiologie et la prophylaxie de la fièvre jaune. Par le Dr. Manuel Carmona y Valle, Professeur de Clinique interneà la Faculté de Médecine de Mexico, etc. Mexico: Imp. du Ministére des Travaux Publics, 1885. 8vo, pp. 299.

Lectures on the etiology and prophylaxis of yellow fever.

The lectures were delivered toward the close of the year 1884; but the researches detailed therein extend over a series of years. The botanical history of the fungus, met with in the various secretions of yellow fever patients, is fully illustrated upon two chromo-lithographic plates, and by six photographs magnifying the objects 500 or 1000 diameters.

Hydronaphthol, a new antiseptic. By Geo. R. Fowler, M. D., Surgeon to St. Mary's General Hospital, Brooklyn. Pp. 31.

Reprinted from the *New York Medical Journal.* (See page 93 of this number.)

Iritis: Its Relation to the Rheumatic Diathesis and its Treatment. By Chas. J. Lundy, A. M., M. D., Professor of Diseases of the Eye, Ear and Throat in the Detroit College of Medicine. Pp. 10.

Reprinted from the *Physician and Surgeon.*

Twelfth Annual Report of the Maternity Hospital, 734 South Tenth Street, Philadelphia. Pp. 17.

Sixth Annual Report of the State Board of Health, Lunacy and Charity, of Massachusetts. Supplement containing the report and papers on public health. Boston: 1885. 8vo, pp. 403.

The most interesting part to pharmacists and druggists is the report by Prof. B. F. Davenport, the analyst of drugs. We note the following results: of 33 samples of jalap (whole or powdered?) 12 yielded over 12 per cent. of resin (the report states alcoholic extract), and 11 less than 10 per cent. Of 5 samples of creasot, 3 consisted of carbolic acid. 14 (out of 15) samples of chloroform were the crude article. The saffron purchased was in all cases (5) safflower; it seems, therefore, as if in Boston the latter article was still demanded under the name of saffron the same as twenty years ago, when such a statement was made before the American Pharmaceutical Association.

The Extra Pharmacopœia, with the Additions introduced into the British Pharmacopœia, 1885. By Wm. Martindale, F. C. S., etc. Medical references and a therapeutical index of diseases and symptoms by W. Wynn Westcott, M. B., Lond., etc. Fourth edition. London: H. K. Lewis. Pp. 416.

After having noticed at some length two of the preceding editions of this work, it remains for us merely to note the publication of the fourth edition, and to state that the appearance of the new British Pharmacopœia rendered a complete revision necessary, in which the essential features of the former editions are preserved, the work including the facts, etc., known at the time of publication. A secondary list has been added, containing notices of American and other drugs which are rarely used in Europe. These drugs, if considered of sufficient importance for admission, it seems to us, would find a more convenient place if placed in regular alphabetical order with the others. Although the book has been increased by 86 pages, it is still suitable for the pocket.

Introductory Address to the Fifth Lecture Course of the Albany College of Pharmacy. Delivered October 5, 1885, by Willis G. Tucker, M. D., Professor of Chemistry. Pp. 14.

Beiträge zur Kenntniss der Alkaloide des Aconitum Napellus. Von Alexander Jürgens. Pp. 45.

Contributions to our knowledge of the alkaloids of Aconitum Napellus.

Beitrag zum Nachweise des Chloralhydrats im Thierkörper. Von Hildebert Baron Tiesenhausen. Pp. 30.

Contribution to the detection of chloral hydrate in the animal body.

Beitrag zum Nachweis des Phenols im Thierkörper. Von Woldemar Jacobson. Pp. 26.

Contributions to the detection of phenol in the animal body.

These three pamphlets contain inaugural essays from the University of Dorpat.

Beitrag zur Chemie der Rhabarberwurzel. Von Mag. pharm. M. Kubli.
Contribution to the chemistry of rhubarb root.
A translation of this valuable essay was published in our December number.

Ueber Untersuchung und Beurtheilung des Trinkwassers vom Standpunkte der Gesundheitspflege. Von Prof. Dr. E. Reichard. Pp. 11.
On the critical examination of potable water from the standpoint of hygiene.

Water, preventable Disease and Filtration. By P. A. Maignen. London. Pp. 63.

The following six pamphlets have reference to the Sixth International Pharmaceutical Congress which was held in Brussels, and the transactions of which were reportcd in our October number, 1885.

Questions à discuter en Sections.

L'Enseignement Pharmaceutique. Par L. De Nobele.

Les Eaux Alimentaires. Par M. Van de Vyvere.

Projet d'une Pharmacopée Internationale. Par Antoine de Waldheim. (The same also in the German language.)

Sur l'Action comparée des différentes Aconitines. Par J. Buntzen et H. P. Madsen.

Le Filtrage. Par P. A. Maignen.

Address of the State Board of Health, and Vital Statistics of the Commonwealth of Pennsylvania to the People of Pennsylvania. Pp. 7.

Massachusetts State Agricultural Experiment Station. Bulletins Nos. 17 and 18.

Avena Sativa, in the treatment of Opium Addiction. A therapeutical fraud, a delusion and a snare. By J. B. Mattison, M. D., Brooklyn, N. Y.
Reprint from the *Medical Bulletin,* October, 1885.

Voice in Singers. By Carl H. Von Klein, A. M., M. D., of Dayton, O.
Read before the Ohio State Medical Society.

The American Practitioner and the *Louisville Medical News* have been consolidated in a bi-weekly journal which, since the beginning of the present year and under the editorial management of Drs. Yandell and Cottell, the editors of the old journals, has been issued under the title of *American Practitioner and News.*

The Chemist and Druggist, a monthly journal published in London, England, has opened branch offices in Australia (Melbourne), and in the United States, the latter being located on Beekman street, in the city of New York.

THE AMERICAN
JOURNAL OF PHARMACY.

MARCH, 1886.

ANALYSIS OF ARISTOLOCHIA FŒTIDA.

(*Yerba del Indio.*)

By Henry Trimble and Samuel S. Jones.

(Read at the Pharmaceutical Meeting, February 16th.)

The root of the above plant, from H. J. Schuchard, Ph. G., of San Antonia, Texas, consists of globular pieces much resembling jalap in size and appearance; externally almost black, and internally, when dry, reddish brown. It possesses a slightly astringent taste and a strong narcotic odor. The loss on drying amounted to 14·10 per cent., and the ash 4·88 per cent.; the latter was found to be composed of the usual constituents.

I. Twenty grams in fine powder yielded to petroleum spirit 1·95 per cent. of a fixed oil, soluble in absolute alcohol and stronger ether, less so in ordinary alcohol. It saponified with aqueous solution of potassium hydrate, yielding a soap on the addition of sodium chloride, which possessed a purplish-red color, due to the presence of a small quantity of the coloring matter.

II. The stronger ether extraction gave but ·5 per cent. of residue, consisting of a resin, soluble in absolute alcohol, chloroform and benzol, and traces of tannin.

III. Absolute alcohol extracted 7·64 per cent. of organic matter, which was partly soluble in water, composed of tannin and its decomposition products 5·3 per cent., and coloring matter 1·3 per cent. There was an absence of reactions indicating glucosides or alkaloids.

IV. Water extracted from the remainder, after subtracting the inorganic portion, 10·24 per cent., made up of mucilage, 2·5 per cent., tannin, 2·6 per cent., coloring matter, 5·14 per cent. A separate determination of the tannin with 10 grams of the original drug, showed the presence of about 11·66 per cent.

V. A 0·2 per cent. solution of sodium hydrate extracted 1·9 per cent. of albuminoids and coloring matter.

VI. Hydrochloric acid (1 per cent.) dissolved 4·11 per cent. of organic matter, which was not further examined.

The residue, after drying, amounted to 52·68 per cent., which yielded 3·75 per cent. to chlorine water, thus representing 48.93 per cent. of cellulose.

75 grams of the original drug were distilled with milk of lime. The first portions of the distillate possessed the narcotic odor of the drug to a marked degree. On shaking this with chloroform the latter took the odor and the alkaline reaction of the distillate. The chloroform was allowed to evaporate spontaneously and the residue dissolved in alcohol gave ammonia on heating with potassium hydrate, and precipitated with a number of the alkaloidal reagents.

While we are not prepared to say there is a volatile alkaloid present, we consider the evidence in favor of such a belief. An insufficient amount of material and the approach of the College examinations prevented further work on this interesting material, which is recommended in the Mexican Pharmacopœia as a good remedy for colic. From other sources we learn it has been used for tanning purposes, but judge the large amount of coloring matter present would be a serious drawback.

The following is a summary of the constituents found:—

Moisture	14·10 per cent.
Ash	4·88 "
Fixed oil	1·95 "
Resin	·50 "
Soluble in absolute alcohol: tannin, coloring matter	7.64 "
Soluble in water: mucilage, tannin and coloring matter	10·24 "
Alluminoids	1·90 "
Soluble in dilute hydrochloric acid	4·11 "
Lignin	52·68 "
	98·00

Antipyrin resembles sodium salicylate in its action, and is recommended by Dr. Neumann (*Berl. Klin. Woch.*), for further trial in chronic rheumatism of the joints and in rheumatic neuralgia. Dr. A Walker (*Brit. Med. Jour.*, Nov. 7, 1885) has observed it, in two cases of typhoid fever, to produce reduction of temperature to about normal, and good refreshing sleep for 5 or 6 hours; 15 grains of the remedy were given at 9 P. M., and 7½ grains each at 10 and at 11 P. M. Antipyrin was also found useful to produce sleep in several cases of pyrexia in young children. Teaspoonful doses three times a day of the following mixture have been used by Dr. Dumolard in typhoid fever: Antipyrin 20, Jamaica rum 30, water 150, and syrup 150 grams.

NOTE ON YERBA AND RAIZ DEL INDIO.

By John M. Maisch.

In the preceding paper, by Messrs. Trimble and Jones, reference is made to the "yerba del indio" admitted into the Mexican Pharmacopœia. The second edition of this work refers the drug in question to Aristolochia fœtida, *Kunth*, and further states, that the plant grows in Ario and other hot districts of the Republic; that the decoction of the leaves and stems enjoys a great reputation as a vulnerary, and that the root is a detersive stimulant.

During the winter of 1874–1875, Rudolph F. G. Voelcker, Ph. G., made a chemical examination of "raiz del indico," the results of which were published in Amer. Jour. Pharm., 1876, p. 49. Specimens of Mr. Voelcker's root, which were then shown to me, though somewhat smaller than the roots examined by Messrs. Trimble and Jones, so strongly resembled the latter, that I am inclined to regard the two drugs as identical. But Mr. Voelcker's root was obviously not obtained from an aristolochia; for the fresh roots, on being planted produced leaves which were *stipulate*, 12 to 13 inches long, $2\frac{1}{2}$ to 3 inches broad, *oblanceolate*, acute, *smooth*, shining, juicy and light-green. Unfortunately the plants had not produced flowers, and I have no information whether they have bloomed in subsequent years. The character of the leaves and the chemical behavior of some of the constituents of the root led Mr. Voelcker to infer that the plant belongs to the natural order of Polygonaceæ. It is certain that it cannot be an aristolochia in which genus the leaves are *exstipulate* and at the base usually heart-shaped.

Aristolochia fœtida, *Kunth*, is a shrubby, twining plant with a somewhat angular and hairy stem; its leaves are reniform-cordate with a short acumination; the basal lobes are rounded and form a narrow sinus, and the base proper is wedge-shaped and decurreat into the petiole; both sides, but more particularly the upper one, are beset with appressed hairs. The leaves are 12 Cm. ($4\frac{1}{2}$ inches) long and broad; the petioles are somewhat shorter, grooved above and somewhat hairy. The plant was found by Humboldt and Bonpland in shady places at an altitude of 1,950 meters (about 6,000 feet), and at that time was known as "yerba del indio" and enjoyed considerable celebrity in the treatment of ulcers, the decoction being used as a wash.

It is evident from this description that the "yerba del indio" of

the Mexican Pharmacopœia cannot be the parent plant of the root examined by Mr. Voelcker. It seems likely, however, that the latter is identical with a root, also known by the name *cañaigre*. At least in the "Report of the Commissioner of Agriculture for the year 1879," a plant is figured, the leaves of which agree in the main with Mr. Voelcker's description, as well as the characteristics of the root given in the report by Mr. Wm. Saunders, superintendent of gardens and grounds in Washington, D. C., who speaks in the Report (page 364) as follows:

"In the report of the department for 1878, at page 119, will be found an analysis of the above-named root (cañaigre)[1]. The main object of the examination was to determine the amount of tannic acid contained in this root which was received from Texas, where it has long been used by the Indians and others for tanning purposes, and is said to be used at present by several tanneries in and about San Antonio. From the analysis it appears that the root contains about 23 per cent. of tannic acid[2], and the fact that the article is employed in tanneries would seem to indorse its practical adaptability as a tanning material. Cañaigre is the bulbous root of a kind of dock specifically called *Rumex hymenosepalum* (Torrey). It grows plentifully in sandy soils over a large territory on both sides of the Rio Grande, and from there northward over a large portion of Western Texas. The bulbs are produced in clusters like some kinds of sweet potatoes, some clusters weighing several pounds, and can be procured, it is stated, at a cost not exceeding $1 per 100 pounds. The leaves of the plant are somewhat fleshy when in the young state, when they are greedily eaten by cattle, and occasionally used as a pot-herb by travelers and others."

The facts as far as they are accessible to me at the present time, point to the identity of the three samples of roots mentioned above, and that they have been derived from the neighborhood of the Rio Grande. From the brief history given it is not in the least surprising that in some localities of Texas this root should have become popularly known as "raiz del indio," and the herbaceous plant yielding it as "yerba del indio," which latter name has long been applied in the interior of Mexico to a woody climber, the root of which, doubtless, differs from the former considerably in its morphological characters,

[1] I have not been able to consult the report containing this analysis.—J.M.M.

[2] Mr. Voelcker found 23·13 per cent. of tannin.—J. M. M.

as it seems to differ in medical properties. I hope to procure reliable specimens with the view of removing any doubt or uncertainty that may still exist.

LABORATORY NOTES.

Abstracts from Theses.

Nabalus albus, Hooker, is known as white lettuce, lion's foot and rattlesnake root. The milky juice used internally and the leaves applied topically were formerly employed in bites of the rattlesnake, and a decoction of the root is used in domestic practice in dysentery and as a tonic. Neri B. Williams, Ph.G., described the root as being tuberous, from 1 to 6 inches long, $\frac{1}{2}$ to 1 inch thick, furnished with several rootlets, yellowish, internally white and emitting a milk-juice; after drying it breaks with a short fracture and is readily powdered; the odor is slight and peculiar, and the taste bitter.

A *tincture*, made with diluted alcohol, 4 oz. of the powdered root to the pint, was of a deep amber color, and was advantageously used by a physician in anemic diarrhœa, chronic dysentery, and in typhoid fever for its tonic and astringent properties; also topically in a case of pruritus ani.

A proximate analysis of the root showed the presence of tannin, gum, extractive, coloring matter, waxy matter and resins, partly soluble in ether. The ash amounted to about 12 per cent.

Fraxinus americana.—Jos. C. Roberts, Ph.G., obtained the following results with the root bark:

1. Moisture, loss by drying at 105° C., 9·63 per cent.

2. Ash, 5·33 per cent. Of this amount 6·25 per cent. were soluble in water, 86.67 per cent. soluble in dilute hydrochloric acid, and the remainder soluble in caustic soda.

3. Benzol extracted 0·67 per cent., containing a little volatile oil. The filtered aqueous solution of the extract gave a precipitate with phosphomolybdic acid, the portion insoluble in water was resin and dissolved in 80 per cent. alcohol.

4. Alcohol (80 per cent.), yielded a brown, somewhat bitter and acrid extract, which on being treated with various solvents and chemicals showed the presence of tannin, alkaloid, resin and sugar.

5. The remaining constituents found were gummy matter, starch, and coloring matter.

Glucosides could not be detected. The volatile oil was of a yellow color, somewhat aromatic and had a rather bland taste. The amount of alkaloid obtained was very small; it refused to crystallize and was contaminated with coloring matter.

Blackberry bark.—Andrew C. Santee, Ph.G., determined in the root bark by qualitative tests the presence of tannin, gummy matter, sugar, little resin, and a saponin-like body, which was not isolated.

Amomum Melegueta, Roscoe.—The seeds, known as me'egueta pepper, or grains of Paradise, were examined by Fred. Schwartz, Ph.G., with the following results:

The powder thoroughly dried by heat lost 18 per cent. of moisture and volatile oil, and on incineration gave 9 per cent. of gray ash. Treatment with cold water furnished a light brown infusion, containing albumen, gummy matter and a little tannin. Benzin now exhausted 5 per cent. of a reddish-brown oily matter, having a slight aromatic odor and a burning taste, and soluble in carbon bisulphide and in ether; on redissolving it in little benzin, the addition of alcohol precipitated a white fat. The powder now yielded to alcohol a reddish-brown acrid resin, which is soluble in ether, but insoluble in carbon bisulphide. Neither bisulphide of carbon nor ether took up any compound from the powder exhausted as above; but treatment with boiling water furnished an amylaceous jelly.

Scammony.—Chas. M. Rebner, Ph.G., examined samples of commercial scammony; the results arranged, according to the amount of resin obtained, were as follows:

1. Starch present; 26 per cent. soluble in ether.
2. " " 40 " " "
3. " " 78·30 " " "
4. " absent; 79·23 " " "
5. Wholly soluble in ether. This specimen was a rather fine, light yellowish powder, and had the odor and taste of scammony; it was resin of scammony.

None of the samples produced any effervescence with hydrochloric acid; and the resin was, in all cases, soluble in hot solution of potassa, and not precipitated on the subsequent addition of an acid.

Elixir of Coca.—Llewellyn H. Lewis, Ph.G., suggests this preparation to be made so that a pint represents the virtues of 4 ozs. of the

leaves. The leaves are powdered and percolated with a mixture of 3 parts of alcohol and 1 part of water, until 11½ fluid ozs. of tincture are obtained, to which is added a solution of oil of orange, 6 drops, and oil of cinnamon, 2 drops, in ½ fluid ounce of alcohol, and afterward 4 fluid ounces of simple syrup.

Fluid Extract of Quebracho.—Henry J. Wegener, Ph.G., has repeatedly been relieved of asthma, caused by handling powdered ipecacuanha, by taking a dose of this fluid extract.

Fluid Extract of Cotton Root-bark.—Chas. C. Ramey, Ph.G, reports several experiments made with this fluid extract, which had been filtered from the precipitate formed therein in about a year, and which in this condition had no effect when used by a physician in cases of menorrhagia. On the other hand, several doses of one grain pills, made from the dried precipitate, produced considerable nausea and effected a diminution of the flow in excessive menstruation. The menstruum used for the fluid extract is not stated.

The coloring matter of Hydrastis is precipitated from the aqueous infusion of the root by basic acetate of lead, according to John W. Newton, Ph.G. After decomposing the precipitate by sulphuretted hydrogen, the coloring matter was again soluble in water, and this solution, which contained 5·90 per cent. of solid matter, did *not* dye cotton cloth, for which acetate of iron, ferric chloride, aluminium acetate, or potassium bichromate had been used as mordants. Subsequently, sodium carbonate and sulphuric acid were added in turn without altering the result.

Hydrargyrum cum Creta.—Robert B. Matter, Ph.G., suggests the following process, which in his hands, has been uniformly successful, and by which 4 or 8 oz. of the preparation can be made within one hour.

Mix 12 parts of finely powdered gum arabic with 12 parts of prepared chalk, triturate it with water sufficient to form a rather thin paste, add 38 parts of mercury and continue the trituration until the globules of mercury have disappeared. Now add 38 parts of finely powdered prepared chalk and sufficient water to form a thin paste, triturate and when all the globules of mercury have disappeared, place the mortar in a hot water-bath. The mixture distributed around the sides of the mortar, will dry rapidly, when it can be easily scraped out, powdered in a clean mortar, passed through bolting cloth, or a fine sieve, and finally rubbed lightly in a clean dry mortar.

ON A NEW PROCESS FOR ESTIMATING TANNIN VOLUMETRICALLY.

By Joseph W. England, Ph. G.

Many processes have been recommended for the volumetric estimation of tannin, but the greater number of them are tedious and difficult to carry out in practice, and even when accomplished yield results far from satisfactory. The process offered by E. Durien (*Annali di Chim. Med. Farm.*, Dec., 1885, p. 350; *Jour. Phar. Chim.*, 1885, xii, p. 374), is very easy of execution and is based upon the following reactions:—

1. That the addition of chloride of iron solution to one of tannin forms a black or green coloration; and—

2. That this coloration is destroyed, little by little, and then completely, on the addition of a solution of chlorinated lime.

The mode of operation, with the results obtained, is as follows:—1. Prepare a solution of calcium hypochlorite (10· gm.) in distilled water (200· gm.) and filter. 2. Make a second solution of pure tannin by this formula:—

Tannin, pure	0·10 gm.
Officinal solution of ferric chloride [1]	15 drops.
Acid acetic, concentrated (glacial)	20 drops.
Distilled water	20· c c.

This solution is made in a 100 c c. glass flask and serves as a titrate to the first solution. With a Gay-Lussac burette, graduated to the one-tenth of a c c., rapidly add, drop by drop, the hypochlorite, agitating after each addition, when the green or black color of the liquid will gradually grow lighter and pass, suddenly, to a rose-brown, at which point the operation must be arrested. This rose-brown color, by the action of the air, passes to a green, but there is no need of taking into calculation this secondary reaction. Working in this manner it will be found that 14 c c. of solution of hypochlorite will be required to destroy the inky color formed from 0·10 gm. of pure tannin.

To fully establish the accuracy of his method, Mr. Durien made various mixtures of sugar and pure tannin, in order to ascertain what

[1] Chlorure Ferrique dissous, French Codex, sp. gr. 1·26; containing 26 per cent. $Fe_2 Cl_6$.

influence, if any, organic substances might have upon the results. The following table gives the figures obtained:

Substance.	Amount.	Sol. of hypochlorite used	Tannin found.	Tannin calculated.	Difference.
Tannin, pure.....	0·10 Gm.	14 c c.			
Mixture A	0·15 "	10·5 cc.	0·075 Gm.	0·075 Gm.	0·000 Gm.
" B.....	0·20 "	13·9 cc.	0·099 "	0·100 "	0·001 "
" C.	0·30 "	20·8 cc.	0·148 "	0·150 "	0·002 "

This series of analyses demonstrates that with this test a most excellent approximation may be made to the quantity of tannin present, and that sugar has no influence on the results. With this process, an assay of commercial tannin can be made in less than ten minutes.

In further extension of this subject, it may be said by the translator of the above that some time ago, without any knowledge of the existence of this method, he endeavored to discover a practical method of tannin analysis based, as in this process, on the decomposition of ink, using, however, a neutral solution. For that purpose I employed ammonia water, which, whilst it changed the ink to a reddish color in very dilute solution, with the precipitation of ferric oxide, was inapplicable for general practice, because of a somewhat similar action upon other organic matter. Potassium hydrate had a like influence. The ferric tannate is also decolorized by chlorine water, diluted sulphuric, nitric, hydrochloric, nitrohydrochloric, or phosphoric acids. Strong acetic acid exerts no change upon it. Gallic acid in a dilute inky-rendered solution, is altered in color by AmHO or KHO, with the formation of a deep rosy-colored solution, resuming its original tint on neutralization with acetic acid. Ferric gallate is destroyed in color by chlorine water, diluted sulphuric, nitric, hydrochloric, nitrohydrochloric or phosphoric acids, but not by strong acetic acid. Hypochlorites will also destroy its color, but alkaline chlorides make no change.

It may be suggested that sodium hypochlorite, in the form of "Labarraques' Solution," deprived of free chlorine gas, be employed instead of the calcium compound, as more readily applicable, since the results afforded by each are the same. The contained sodium chloride exerts no action upon the tannin-ink, so the change is

entirely dependent upon the hypochlorite alone, in the absence of free chlorine gas, which also has the same properties of decolorization.

Since gallic acid, as well as tannin, rendered inky by the addition of ferric salts, is changed in color by hypochlorites, the absence of that body in the tannin solutions must be previously determined in the application of Mr. Durien's method.

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

By the Editor.

(Continued from page 77.)

Sanguinaria, Illecebrum Paronychia, *Lin.*, Caryophyllaceæ; in the valley of Mexico. The flowers are astringent.

Saponaria. Anagallis arvensis, *Lin.*, Primulaceæ, is usually substituted for Sap. officinalis; the former is known as "coralilla" or "saponaria de país."

Saúco, Sambucus mexicana, *Priestley;* Caprifoliaceæ. The flowers, leaves, bark and berries, which have not been analyzed, are used in a similar manner, as the corresponding parts of the European elder.

Semillas de bálsamo, Myrospermum Pereiræ, *Royle;* Leguminosæ; in Cuautla de Morelos, Pánuco and other hot districts. The legumes are indehiscent, one-celled, one-seeded, oval and scimetar-shaped, brownish yellow, rugose on the surface, convex and keeled on the margin, and provided with a wing which is much elongated above; the pericarp contains ducts which are filled with a resinous balsamic matter. Other fruits found in commerce, which have a longer wing and a less delicate odor, are produced by Myrospermum peruiferum. The fruit is antispasmodic and stimulant, and the tincture is employed internally as an antispasmodic, and externally against rheumatism.

Siempreviva de México, Aizoon canariense, *Lin.;* Ficoidaceæ; cultivated. Used as a dentifrice and antiscorbutic, and the juice as an astringent.

The name siempreviva is also applied to other plants of different genera and families, like Bryophyllum calycinum, *Lin.* (also called Bruja or Amor tras de la puerta), several species of Helichrysum, &c.

Simonillo, Calea Zacatechichi, *De Cand.;* Compositæ; in the Mexican valley, Puebla, Orizaba, &c. The plant is used popularly as a tonic and antiperiodic in infusion 8:500. Drs. Soriano, Campuzano and others have used it successfully against hepatic calculi.

Sinfito or Sueldaconsuelda. The roots of Potentilla aurea, *Lin.*, and of the more common P. multifida, *Lin.*, are astringent, and are believed to have the same properties as the European comfrey.

Sinicuiche, Nesæa salicifolia, *Kunth;* Lythraceæ; in Tenancingo. The infusion of the leaves is used in indigestion and it is said to produce a very agreeable intoxication, and that those who have taken it, see all objects of a yellow color.

Socoyol, Oxalis angustifolia, *Kunth*, O. verticillata *Mociño*, O. corniculata, *Lin.*, and O. violacea, *Lin.* The leaves contain potassium oxalate and may be substituted for sorrel.

Tabaco. Besides Nicotiana Tabacum, *Lin.*, the aborigines cultivate also N. rustica, *Lin.*, N. paniculata and other species. As "tabaco cimarron" are used N. pusilla, *Lin.*, in Veracruz, N. pilora, *Dunal*, and N. trigonophylla, *De Cand.*, in Aguascalientes, N. mexicana, *Schlechtendal*, and others. N. glauca, *Graham*, is called, "tabaquillo." All these species possess similar properties.

Tabachin, Poinciana pulcherrima, *Lin.;* Leguminosæ; in the hot and moist districts of the western slope. The leaves are purgative and emmenagogue. The legumes are employed for tanning and for dying wool yellow with alum and black with iron salts. The analysis (of the legumes?) by Ricord Madiana, showed the presence of gallic acid, tannin, red coloring matter, gum, soft resin, benzoic acid and salts.

Tacamaca, Icica heptaphylla, *Aublet;* Terebinthaceæ; in various hot districts of America. Fragments opaque, frequently with pieces of bark adhering, the surface covered with a gray efflorescence, the layers beneath alternately sulphur-yellow and dull white or dingy gray, odor resinous, taste bitter; fusible and on burning giving off smoke having the odor of frankincense. Other varieties of tacamaca are rarely seen in Mexican commerce. Stimulant and antispasmodic in doses of 0·5 to 2·0 gm.; mostly used externally.

Tacopatle, Aristolochia mexicana, *Flor. Mex. ined.;* Aristolochiaceæ; in Guerrero and other hot districts. The root is of the thickness of a goosequill, gray and wrinkled and has a yellowish meditullium and a pungent and bitter taste. Antispasmodic.

Tamarindo, Tapioca, Tapsia (root and resin), Té (tea), Tilia, Toloache (stramonium), Tormentila, Trigo (wheat), Turbit vegetal (turpeth root), Tusílago (coltsfoot leaves and flowers), Uña de gato (rose hips), Vainilla, Verbena (V. officinalis and V. caroliniana), Verdolaga (Portulaca oleracea), Verónica (V. peregrina and V. officinalis), and

Violeta española (sweet violet petals), are mentioned as medicinal articles.

Tanibata, Ipomœa stans, *De Cand.;* Convolvulaceæ; in the mountains of Guadalupe. The root is purgative.

Taray de México, Varennea polystachya, *De Cand.;* Leguminosæ; in the ravines of Mochitiltic, near Puebla, &c. The wood is seen in commerce in pieces of various dimensions; bark fissured, reddish brown; wood yellowish with a brownish tint, some layers reddish, compact; taste sweetish and astringent when fresh, and after drying slightly astringent. The infusion is used in diseases (epizootias) of chickens, and the decoction in inflammations of the kidneys and of the bladder. For this wood that of "palo dulce," Eysenhartia amorphoides, of the same natural order is frequently substituted; it is readily distinguished by its white color. The taray of Europe, Tamarix gallica is not used in Mexico.

The gum, which exudes spontaneously, is in small agglutinated fragments, superficially opaque, the fractures glossy and vitreous, reddish brown, resembling kino; odor faint; taste very astringent and free from bitterness. According to Oliva it consists of tannin with a small quantity of coloring matter and impurities. It has the same medicinal properties as tannin and may advantageously be substituted for kino.

Té limon, a cultivated grass, probably Andropogon citratus, *De Cand.* The infusion of the leaves, 1:250, is used as a digestive stimulant and antispasmodic.

Té de Milpa, Bidens tetragona, *De Cand.;* Compositæ; in the Mexican valley, &c. The leaves after having been transiently subjected to the action of boiling water, then dried and rolled like Chinese tea, are used like the latter. Mendoza found them to contain tannin, fat, concrete volatile oil, protein compound and coloring matters. Bidens leucantha, *De Cand.*, is known by the same name and the leaves are used in a similar manner.

Tecomate, Crescentia Cujete, *Lin.;* Bignoniaceæ; in hot districts. The pulp of the fruit is used in various affections of the liver and for its pectoral properties.

Tejocote, Cratægus mexicana, *Mociño et Sessé;* Rosaceæ; indigenous and cultivated. The decoction of the root has antidysenteric and diuretic properties, and that of the fruit is pectoral; the latter yields an abundance of jelly and is much used as an aliment.

Tepeacuilotl, Cornus alba, *Lin.;* Cornaceæ; Monte de las Cruces. The bark is tonic and astringent.

Tepeguaje, Acacia acapulcensis, *Kunth;* Leguminosæ; in the hot districts of the western slope. The bark is rich in tannin and is astringent; the gum which exudes from the bark is used as a substitute for gum arabic.

Tepozan, Buddleia americana, *Lin.;* Scrophulariaceæ; in the Mexican valley and in many other localities. The bark and root are used in the form of decoction, in various uterine affections and as diuretics; also, the same as the leaves, for their resolvent and vulnerary properties and for relieving pain of the joints.

Tequezquite is the name given to saline efflorescences, containing sodium carbonate, and met with in different parts of Mexico. The purest is "tequezquite espumal" from the northeastern part of Lake Texcoco, and contains according to Hay, anhydrous sodium carbonate 516, sodium sulphate 153, sodium chloride 0·45, water 246, earthy matters 0·30. "Confitillo" contains 28 per cent., and "Cascarilla" 20 per cent. of sodium carbonate, both containing 30 to 35 per cent. of earthy matters. A very impure variety is "Polvillo" with 5 sodium carbonate, 1·5 sodium sulphate, 6 sodium chloride and 85 earthy matters. The article is used for alkaline baths, and for the manufacture of soap and of sodium carbonate.

Tescalama is a resinous exudation obtained from incisions made into the bark of Ficus nymphæifolia, *Lin.*, a tree growing in hot regions of the eastern slope of the Sierra Madre. It is preserved under water whereby it retains its consistence. It is used as a dressing for fractures and for various uterine affections.

Tezacpatli, Senecio præcox, *De Cand.;* Compositæ; in mountainous districts. The decoction of the leaves is vulnerary and antirheumatic.

Tianguipepetla, Illecebrum (Alternanthera, *De Cand.*) achyrantha, *Lin.;* Caryophyllaceæ; in many parts of the country. An analysis by Laso de la Vega showed the presence of a small quantity of soft resin having a nauseous taste, extractive, alkali nitrates and oxalates, &c. The decoction and the juice used freely as a drink and in the form of clysters, also cataplasms of the plant, have considerable reputation among common people for the cure of what is called burning fever. The plant is believed to be diuretic and diaphoretic.

Timbirichi, Bromelia pinguin, *Lin.;* Bromeliaceæ; in hot localities. The fruit is anthelmintic and antiscorbutic.

Tlacaxochitl, Hedyotis americana, *Cervantes;* Rubiaceæ; near the city of Mexico. The root is astringent.

Tlalpopolotl, Flourencia thurifera, *De Cand.;* Compositæ; in hot regions. The root is pectoral and vulnerary, and the resin is used as a substitute for frankincense.

Tlanepaquelite or Yerba santa, Piper sanctum, *Mociño et Sessé;* in Orizaba, Oaxaca and other states. The leaves are stimulant and are used as a condiment. By distillation the plant yields a volatile oil, heavier than water and resembling oil of sassafras.

Tlatlancuaya or Yerba del tabardillo, Achyranthes calea, *Ibañes;* Amaranthaceæ; Isúcar de Matamoros and Atlixco. Stem subsuffruticose, thick, striate when young, afterward rugose and knotty, green, somewhat bluish and spotted, with a light reddish tint between the nodes; leaves ovate-lanceolate, entire, not hairy, 8 to 12 or sometimes 22 Cm. long, and 4 to 6 or 9 Cm. broad; flowers very small, hermaphrodite and arranged in lanuginous glomerules; fruit an akene crowned by the style, the pericarp thin, membranous and in the upper half with red dots. Ibañez found in the plant fat, coloring matters, extractive, albuminoids, sugar and oxalates, nitrates, chlorides and phosphates. The plant is popularly esteemed as an excellent febrifuge; the concentrated decoction is used principally in typhus.

Tomate, Physalis pubescens, *Lin.*, Ph. peruviana, *Lin.*, and other species of Physalis (Solanaceæ) are indigenous and cultivated in Mexico, the fruit being used as a condiment and externally as an emollient.

Tomatillo, Physalis angulata, *De Cand.;* in Tabasco, Yucatan and other states. The entire plant is antiperiodic.

Tomillo, Thymus vulgaris, *Lin.*, is cultivated in Mexico, but in its place the "tomillo de Jalapa," Micromeria jalapensis, *De Cand.*, which has identical properties, is often used.

Toronjil, Cedronella mexicana, *Bentham;* Labiatæ; in Xochimilco, &c. The flowering tops are used as a substitute for melissa; they contain an abundance of volatile oil which is also employed. The same name is also applied to Cedronella pallida, *Lindley*, and Calamintha Nepeta, *Link*, of which the former is more frequently collected and has an odor resembling that of pennyroyal.

Trementina comun, obtained from incisions made into the trunk of the "ocote," Pinus Teocote, *Schlechtendal*, which grows in the mountains near the Mexican valley and in many other places. The turpentine has the consistence of a thick syrup, and ordinarily a dingy white

color, and is granular; in closed vessels it separates into two layers, the lower one being resinous and opaque, and the upper one liquid and transparent; it has a penetrating peculiar odor, and a bitter and acrid taste, is soluble in alcohol and ether, and solidifies with magnesia. The commercial article usually contains fragments of bark and other foreign substances. It yields a volatile oil, commonly called "aguarrás." It is used like other turpentines as a balsamic stimulant in doses of 0·50 to 4·8 or 15 gm.; the volatile oil in doses of 10 to 20 drops.

Tripa de Júdas, Cissus tiliacea, *Kunth;* Vitaceæ; in the Mexican valley, Morelos, &c. The decoction and the tincture of the stem have considerable reputation for the cure of rheumatism.

GLEANINGS FROM FOREIGN JOURNALS.

By Geo. H. Ochse, Ph.G.

Valuation of Ipecacuanha.—Prof. Flückiger exhausts from 10 to 20 grams of very finely powdered ipecacuanha with boiling chloroform, to which 1 c c. of aqua ammoniæ, sp. gr. 0·920 has been added until no turbidity is produced on dropping a few drops of the chloroformic solution into acidulated water and treating with potassiomercuric iodide. The chloroform is then distilled off and the emetine, which is almost pure, is dried at 100° C. and weighed. Owing to the absence of a good crystalline salt of emetine, Flückiger prefers to weigh it instead of determining with Mayer's reagent. By dissolving the emetine in dilute acids and precipitating with ammonia or magnesia a purer article is obtainable, but he considers this unnecessary. Ipecacuanha contains on an average not much more than 1 per cent. of emetine. The seeds of Psychotria Ipecacuanha have not the remotest bitter taste and consequently contain no emetine.—*Pharm. Post,* 1886, xix, p. 55.

Properties of pure zinc.—L'Hôte obtained pure zinc by distilling a mixture of pure precipitated oxide of zinc and lampblack. Pure zinc does not generate hydrogen when boiled with water, nor is it affected by dilute sulphuric acid. When pure zinc is melted and stirred with an irod-rod, the small quantity of iron which adheres to the zinc, generates hydrogen when boiled with water and is affected by dilute sulphuric acid. Arsenic and antimony affect it similarly. All varieties of commercial zinc decompose water on boiling.—*Chemiker Zeitung,* 1886, x, p. 2.

To increase the tenacity of filtering paper, Francis draws it through nitric acid, sp. gr. 1·42, and immediately washes with water. When thus treated filtering paper shrinks somewhat and weighs slightly less; it can be washed and rubbed just like linen without losing its filtering properties. A strip of ordinary filtering paper 25 millimeters wide could not support more than 100 to 150 grams, whilst a strip treated with nitric acid supported 1·5 kilograms.—*Pharm. Zeitung,* 1886, xxxi, p. 19.

Action of sunlight on iodoform.—Daccomo states that iodoform is completely decomposed by sunlight in the presence of oxygen. The decomposition does not take place when the iodoform is kept in vacuo, or in gases which are indifferent. The reaction is as follows: $2\,CHI_3 + 5O = 3I_2 + 2\,CO_2 + H_2O$.—*Pharm. Zeitung,* 1886, xxxi, p. 19.

Strychnine test.—Prof. Flückiger recommends the following test as the "classical test" for strychnine: Dissolve 1 centigram of chromate of potassium in 5 c c. of water and add 15 grams (8·15 c c.) sulphuric acid of sp. gr. 1·84 at 15° C. Suspected solids are sprinkled with it on a porcelain plate, when, if strychnine is present, the characteristic blue coloration is produced. If the strychnine is in solution a distinct blue zone is obtained by dropping the suspected solution into the reagent. Several substances prevent the formation of the blue color. A mixture of equal parts of strychnine and brucine only shows the brucine (red) coloration when treated with the reagent. The strychnine test is applicable only when there is at least ten times as much strychnine as brucine present.—*Pharm. Zeitung,* 1886, xxxi, p. 10.

The lowest temperature.—Olzewski claims to have obtained a temperature of—225° C. by evaporating solid nitrogen with a pressure of only 4 millimeters of mercury.—*Pharm. Post,* 1886, xix, p. 10.

Soluble citrate of magnesium can be prepared by fusing 100 parts of citric acid in 25 parts of water by means of a water-bath, and adding 64 parts of carbonate of magnesium. Unless properly dried it loses its solubility in water.—*Schweiz. Wochenschrift,* 1886, xxiv, p. 12.

Absinthin, the bitter principle of wormwood, has been obtained in a crystalline form by Duquesnel. The crystals form colorless prisms, have no odor and are intensely bitter. Absinthin augments or restores the appetite and is purgative. It is best administered in globules, mornings and evenings, before meals.—*Répertoire de Pharmacie,* 1886, xlii, p. 15.

THE TESTS FOR ATROPINE.

By Professor Flückiger.

We are indebted to Mr. A. W. Gerrard for an interesting paper on "A New Reaction and Test for Atropine and the Mydriatic Alkaloids," published in the *Pharmaceutical Journal*, vol. xiv (1884), pp. 718 and 729. It was shown by the author that the mydriatic alkaloids are possessed of a quite exceptional alkaline power towards mercuric chloride, from the aqueous solution of which they precipitate mercuric oxide, the other natural alkaloids giving no precipitate at all with mercuric chloride, or, at least, in no case separating mercuric oxide. Mr. Gerrard's statements were confirmed by Dr. Schweissinger,[1] of Heidelberg, who moreover ascertained that hyoscyamine shows the same behavior, but not homatropine. As to my own experience, I likewise found Mr. Gerrard's results to be correct. One milligramme of atropine dissolved in 1 c cm. alcohol (0·830 specific gravity) yields a yellowish precipitate as soon as 1 c.cm. of a decinormal solution of mercuric chloride (27·1 gm. in 1 litre of water) is added. On standing for an hour or two the precipitate (an oxychloride of mercury) turns red, and proves to consist finally of mercuric oxide.

The same precipitate fails to make its appearance if other alkaloids are used. Thus, for instance, a saturated aqueous solution of codeine may be boiled with mercuric chloride without affording a precipitate of mercuric oxide; on cooling a white or whitish compound of the alkaloid and the chloride crystallizes in the liquid.

In a paper contained in the *Archiv der Pharmacie*, vol. ccxxii (1884), 605, I examined the action of phenolphtaleïn on alkaline substances, and stated that alkaloids are unable to produce the same red coloration with solutions of phenolphtaleïn as the inorganic alkalies. In repeating now these experiments I may even add that the same fact applies to so eminently an alkaline substance as pyridine. Litmus paper turns intensely blue if moistened with pyridine, but paper imbued with a solution of phenolphtaleïn (0·318 in 50 c cm. alcohol and 50 c cm. water) is not reddened by pyridine.

E. Léger[2] made a curious application of this behavior of alkaloids. He titrates sulphate of quinine by means of soda or potash, using

[1] *Pharmaceutische Zeitung*, 1884, No. 79, Supplement, October 1; also in the *Archiv der Pharmacie*, ccxxii (1884), 827. See also Amer. Jour. Phar. (1884), p. 206.

[2] *Journal de Pharmacie et de Chimie*, xi (1885), 425.

phenolphtaleïn as an indicator. One molecule of either soda or potash, as required for replacing one molecule of quinine, will not act on phenolphtaleïn, because the alkaloid set at liberty does not produce the red coloration. But the least excess of soda or potash will immediately be indicated by the red color due to the action which now sets in between soda (or potash) and phenolphtaleïn.

In my first investigation, when I stated that the alkaloids were devoid of action on phenolphtaleïn, I had not tried atropine, but now I am astonished to see that this alkaloid, quite exceptionally, is able to impart a red coloration to phenolphtaleïn paper, thus contradicting my first assertion that alkaloids generally were deprived of such an action. This new experiment of mine is very remarkable, inasmuch as it is in perfect accordance with Mr. Gerrard's test. He has pointed out that atropine (and its congeners) is more powerfully alkaline than mercury, whereas other alkaloids are unable to take the place of mercury in the mercuric chloride. With regard to phenolphtaleïn I have likewise demonstrated that atropine is the only alkaloid—speaking, however, simply of the more generally used alkaloids—which displays the same action as the inorganic alkalies. Certainly, this is a very remarkable coincidence, speaking much in favor of the suggestion that atropine must be somewhat particularly constituted, differing from other solid alkaloids, none of which, as far as we actually know, shows the same behavior towards mercuric chloride or phenolphtaleïn. I have also tried some other coloring matters, viz., cyanine, methyl-orange, phenacetolin, tropæolin, and found them to be acted upon by atropine in the same way as by soda or potash. Mercurous chloride (calomel), however, is not blackened by atropine as it is by soda, potash, or ammonia, and also by pyridine.

It remained to be ascertained that the above-mentioned reactions of atropine were not due to traces of inorganic alkalies, a slight admixture for instance of carbonate of sodium or potassium. But a little of the atropine under examination burnt in a platinum crucible yielded no residue at all, nor did a solution of phenolphtaleïn assume any coloration when I afterwards filled the crucible with it. It might therefore be granted, that my specimen of atropine was fairly pure.

In conclusion, we have proved, Mr. Gerrard, Dr. Schweissinger, and myself, that atropine (and hyoscyamine—Dr. Schweissinger) has an alkaline power like the hydrates of sodium or potassium, differing in this respect from (probably all) other alkaloids.

The reactions just alluded to may as well be used in the identification of atropine. I have modified and completed the other tests for the said alkaloid in the following way:

I. One milligram of atropine and about the same quantity of nitrate of sodium are rubbed together by means of a glass rod, the top of which is to be moistened with very little sulphuric acid (1·84 sp. gr.); this may best be performed on a porcelain dish or slab. Then a little sodium hydrate is rubbed in a mortar with absolute alcohol, so as to form a saturated solution. If this is poured drop by drop on the oxidized alkaloid, a red or violet color is developed.

II. Nitrite of sodium, instead of nitrate, applied in the same way as above, yields an orange mixture, turning red, violet, or lilac, if it is gradually diluted by an aqueous solution of hydrate of sodium, about 1·160 sp. gr.; the caustic lye is to be added in excess.

III. Atropine may be heated to the boiling point in a mixture of one volume of glacial acetic acid and one volume sulphuric acid (1·84 sp. gr.) without any coloration. At last the boiling liquid begins to display a well marked green-yellowish fluorescence. After cooling, the liquid evolves the odor of acetic acid, but besides a very pleasant aromatic smell is distinctly perceptible.

I may add, moreover, that hyoscyamine as well as homatropine show the same behavior as atropine with regard to phenolphtaleïn. The most conclusive way for demonstrating this fact is to place one milligram, or even much less, of the alkaloid on phenolphtaleïn paper. Then add one drop of alcohol, 0·81 sp. gr. or absolute; no coloration at all will be noticed. Allow the alcohol to evaporate and then touch the alkaloid with a drop of water. Now the brilliant red coloration will immediately make its appearance; it disappears as soon as alcohol is again applied, and reappears when the latter is allowed to evaporate.

Dr. Schweissinger stated homatropine to be devoid of action on mercuric chloride. In my experiments, however, I ascertained that it perfectly agrees in that respect with atropine, whereas hyoscyamine did not yield a precipitate in the solution of mercuric chloride.

Lastly, I thought it interesting enough to try also *cocaïne*. The alkaloid produces a blue coloration on litmus paper if moistened with either water or alcohol, but it does not partake of the power of reddening phenolphtaleïn paper. As to mercuric chloride, cocaïne immediately affords a very abundant purely white precipitate. But it

would be impossible to investigate its composition inasmuch as it very soon turns red as in the case of the mydriatic alkaloids.

Thus, mercuric chloride as well as phenolphtaleïn are to be considered as very valuable tests for alkaloids.—*Strassburg, Germany.*—*Pharm. Jour. and Trans.*, January 16, 1886, p. 601.

CUPREINE AND HOMOQUININE.

By Dr. O. Hesse.

Dr. Hesse, in repeating the experiments published in this Journal by Paul and Cownley,[1] found that caustic lime acts upon homoquinine salts in the same way as caustic soda, but that it was advantageous to boil the precipitated alkaloid with excess of caustic lime in order to extract the whole of the cupreine. By boiling a suitable bark with caustic lime the cupreine could be also extracted at once, but it was then associated with another alkaloid, from which the cupreine had to be separated in the form of neutral sulphate. The yield thus obtained was very small, and for that reason Dr. Hesse preferred to prepare cupreine by operating upon the quinine sulphate obtained in the ordinary way from cuprea bark. This was dissolved with dilute sulphuric acid, an excess of caustic soda added, and the quinine separated by ether. The alkaline liquor was then heated and neutralized with sulphuric acid, and the cupreine sulphate crystallized out. The sulphate was treated with ammonia and hot ether, and as the solution cooled the cupreine crystallized out. The crystals were then digested with chloroform to remove a remaining trace of quinine, and the undissolved portion recrystallized from boiling alcohol or dissolved with dilute sulphuric acid, excess of ammonia added, and the mixture shaken with ether sufficient to dissolve the alkaloid. After a time cupreine separates from the ether solution in groups of concentric prisms, which contain two molecules of water, while the crystals obtained from an alcohol solution generally contain somewhat less water. Analysis gave results agreeing with the formula $C_{19}H_{22}N_2O_2$. The crystallized alkaloid does not lose all its water at 100°, but only when heated to 120° or 125° C. In a perfectly dry state cupreine melts at 198° C. It is but sparingly soluble in ether or chloroform, more so in alcohol. An alcohol solution has a strong basic reaction; it acquires a dark reddish-brown color with ferric chloride, and an intense dark green color on

[1] *Pharm. Jour.*, [3], xv, 221. See Amer. Jour. Phar. (1884), p. 575, and (1885), p. 249.

addition of chlorine and ammonia. The solution in excess of dilute sulphuric acid shows no fluorescence; with ammonia it gives a flocculent precipitate that is sensibly soluble in excess of ammonia and readily dissolved by caustic soda. The alkaloid can be extracted from the ammonia solution by ether, but not from the soda solution, provided there is some excess of soda present. After adding to such a solution sufficient ammonium chloride to convert the caustic soda into chloride the alkaloid can be dissolved out by ether.

Cupreine is lævorotatory; it is a strong base, neutralizes acids perfectly, forming salts, having a neutral reaction, that dissolve in hot water with a yellow coloration. The acid salts give colorless solutions. The following salts have been examined and described by Dr. Hesse:

Cupreine Sulphate $(C_{19}H_{22}N_2O_2)_2H_2SO_4+6H_2O$ crystallizes in minute white needles, very difficultly soluble in cold water, and insoluble in a saturated solution of sodium sulphate.

The acid sulphate, $C_{19}H_{22}N_2O_2,H_2SO_4+H_2O$, crystallizes in prisms with numerous faces; it is sparingly soluble in cold water, readily soluble in hot water.

Cupreine Hydrochlorate $(C_{19}H_{22}N_2O_2,HCl+H_2O)$ crystallizes in small needles, moderately soluble in cold water, less readily in sodium chloride. The solution acquires an intense dark-brown color when mixed with ferric chloride.

The acid salt $C_{19}H_{22}N_2O_2(HCl)_2$ forms anhydrous prisms of a yellowish color, moderately soluble in cold water and sparingly soluble in hydrochloric acid.

Cupreine Tartrate $(C_{19}H_{22}N_2O_2)_2C_4H_6O_6+H_2O$ forms delicate white needles, very sparingly soluble in cold water. The crystals effloresce in dry air.

Cupreine Sulphocyanate.—A hot solution of the neutral hydrochlorate becomes turbid when mixed with a moderately dilute solution of potassium sulphocyanide, and gradually concentric groups of acicular crystals are separated as the turbidity disappears. The salt is very sparingly soluble in solution of potassium sulphocyanide, and is precipitated in an oily form by an excess.

Platinum salt $(C_{19}H_{22}N_2O_2)_2PtCl_6H_2+4H_2O$.—A solution of neutral cupreine hydrochlorate gives with solution of sodium platinochloride a yellow flocculent precipitate that is very sparingly soluble in cold water. When heated, this salt assumes a dark green color before burning.

The acid salt, $C_{19}H_{22}N_2O_2PtCl_6H_2+H_2O$, is obtained as a yellow

flocculent precipitate when a solution of the hydrochlorate is mixed with platinum chloride. The precipitate soon changes into small flat needles, very sparingly soluble in hot water, more readily in dilute acid. The water of crystallization is not entirely driven off under 130° C.

Cupreine combines with bases as well as with acids. For complete solution in caustic soda or caustic potash a slight excess of caustic alkali is requisite, and Dr. Hesse considers that this is owing to the relative solubility of the compounds formed. When equal molecular proportions of cupreine and soda or potash are mixed and the solution shaken with ether a small portion of the alkaloid, from $\frac{1}{8}$ to $\frac{1}{10}$ is dissolved by the ether, but this may be prevented by using some excess of alkali.

The potash compound is very soluble in water; on evaporating the solution or on adding caustic soda it separates in a gelatinous state.

The soda compound is similar to the above; when mixed with excess of of caustic soda and warmed the jelly dissolves, and on cooling colorless crystalline laminæ of a silky lustre are formed.

The lime compound.—When a solution of the potash compound is mixed with calcium chloride a copious precipitate of the lime compound is formed. It is moderately soluble in boiling water, but little in cold water. The hot solution becomes gelatinous on cooling.

The compound with lead oxide is formed when a solution of the soda compound is mixed with an equivalent quantity of lead acetate solution as a yellow flocculent precipitate that is very sensibly soluble in cold water and has a strong alkaline reaction.

The compound with silver oxide is obtainable in a similar manner as a yellow flocculent precipitate that is moderately soluble in cold water. This solution has a strong alkaline reaction.

The foregoing results led Dr. Hesse to the opinion that cupreine might contain phenolhydroxyl, and that by the action of acetic anhydride a derivative might be obtained, in which the phenol character was extinguished. To determine this point, which turned out to be as he anticipated, dry cupreine was mixed with acetic anhydride, in which it dissolved after heating to 85° C. for some time. When the reaction had been continued a few hours water was added, and the liquid almost neutralized by careful addition of ammonia. By precipitating the base with ammonia and dissolving it in ether colorless hexagonal plates were obtained on evaporation, consisting of diacetyl-

cupreine, $C_{19}H_{20}(C_2H_3O)_2N_2O_2$. The crystals of this substance are anhydrous; it melts at 88° C., dissolves with moderate ease in alcohol and ether, very readily in chloroform. The spirit solution has a strong alkaline reaction; it gives no color with ferric chloride, but with chlorine and ammonia it becomes dark green. The base is dissolved by dilute acids, and is precipitated on addition of ammonia or soda; by contact with caustic soda it is converted in a few minutes into acetic acid and cupreine.

Diacetylcupreine Hydrochlorate ($C_{19}H_{20}(C_2H_3O)_2N_2O_2HCl$).—This salt has the form of hexagonal plates; it is very soluble in water or alcohol; the solution gives no color with ferric chloride. With platinum chloride an amorphous precipitate is formed that is very sparingly soluble in cold water.

The previous observation that homoquinine when heated to 140° C. with hydrochloric acid (1·125 specific gravity) in a closed tube is converted into methyl chloride and apoquinine led Dr. Hesse to expect apoquinine only would be formed by acting upon cupreine in the same way. He found that to be the case.

By comparing the formulæ representing the composition of cupreine and of quinine it is evident that quinine stands in the relation of a methyl ether of cupreine, or that it differs from cupreine by containing the elements of methyl in place of hydrogen, as shown by the following:

Cupreine.	Quinine.
$C_{19}H_{20}N_2 \begin{cases} OH \\ OH \end{cases}$	$C_{19}H_{20}N_2 \begin{cases} OCH_3 \\ OH \end{cases}$

It is therefore conceivable that cupreine might be convertible into quinine by a substitution of methyl for hydrogen, according to the following equation:

$$C_{19}H_{21}MN_2O_2 + C_3HI = MI + C_{19}H_{21}(CH_3)N_2O_2.$$

The experiments made to effect this substitution were not successful in producing quinine, though repeated with various modifications several times. In one instance cupreine was dissolved in water with a molecular proportion of caustic soda and then mixed with silver nitrate. Cupreine silver was thus formed and precipitated in yellow flocks. A molecular proportion of methyl iodide dissolved in alcohol was then added and the mixture heated in a closed vessel. Reaction soon took place and silver iodide was formed, the solution becoming deep yellow. After twelve hours the liquid was filtered and evaporated

to remove spirit; the residue had a strong alkaline reaction and was extracted with ether which dissolved only a minute quantity of cupreine. The remaining alkaline liquid was neutralized with hydrochloric acid and mixed with potassium iodide solution which gave a precipitate of methyl cupreine iodide. This compound can be obtained more readily by mixing an alcoholic solution of cupreine with methyl iodide. After a short time methyl cupreine iodide separates from the solution almost entirely and can be obtained pure by a crystallization from boiling water. It forms small colorless needles which are anhydrous, very sparingly soluble in cold water or alcohol and insoluble in ether, but very soluble in acids and alkalies. The iodide is not sensibly altered when a solution in caustic alkali is boiled for a long time, and on neutralizing the solution it is again precipitated, but of a slight yellow color. Its composition is represented by the formula $C_{19}H_{22}N_2O_2CH_3I$. The corresponding chloride was obtained by digesting the iodide with freshly precipitated silver chloride and hot water. On cooling the solution it crystallized in small needles, sparingly soluble in cold water, readily in hot water with yellow color. The solution becomes dark reddish-brown with ferric chloride, with very little chlorine and ammonia dark green. The salt is readily soluble in acids and alkalies, but gives no fluorescence. The platinochloride $C_{19}H_{22}N_2O_2.CH_3,PtCl_6H+H_2O$ is an orange-colored crystalline precipitate slightly soluble in water.

The neutral sulphate $(C_{19}H_{22}N_2O_2.CH_3)_2SO_4$ was obtained by digesting the iodide with silver sulphate and hot water. By evaporating the yellow solution the sulphate crystallized in small needles, very soluble in cold water, and giving the above-mentioned reactions with ferric chloride and chlorine and ammonia.

The base was obtained by adding baryta water to a hot solution of the sulphate. On evaporation the base remains as a yellow amorphous mass; it is very bitter, insoluble in ether, very soluble in water. The solution has a strong alkaline reaction; when mixed with a small quantity of ferric chloride hydrated ferric oxide is at first precipitated and re-dissolved on adding more ferric chloride, the solution becoming dark reddish-brown. The solution of the base mixed with excess of chlorine becomes of a fine deep red color on the addition of ammonia, but with only a small quantity of chlorine a green color is produced. The base dissolves in excess of dilute sulphuric acid without fluorescence, but in alcohol with bluish-green fluorescence. It is

readily soluble in caustic soda and when heated with an excess did not appear to be much altered.

In these compounds of methyl cupreine the phenolhydroxyl maintains its full influence; but there was reason to expect that by suitable treatment they might be converted into methylcupreine methyl or quinine methyl compounds after the manner represented by the following equation:

$$C_{19}H_{21}MN_2O_2.CH_2I + CH_3I = MI + C_{19}H_{21}(CH_3)N_2O_2,CH_3I.$$

But experiment did not confirm this anticipation and on the contrary dimethylcupreine compounds were obtained. In operating with the silver compound dimethylcupreine hydroxide was easily obtained, a highly basic substance giving a reddish-yellow solution in water. When slightly supersaturated with hydrochloric acid and mixed with potassium iodide solution dimethylcupreine iodide crystallized out in brilliant reddish-yellow laminæ, sparingly soluble in water, readily in acid, alkalies and alcohol, having the composition represented by the formula $C_{19}H_{22}N_2O_2(CH_3I)_2 + 5\,H_2O$.

The attempts to effect a synthesis of quinine or its methyliodide compound having so far failed the sodium compound of the iodide was again subjected to the action of methyl iodide in closed tubes at 100° C. The solution thus formed was dark brown; it had no basic reaction, and when mixed with water deposited a brown resinous substance. As sodium iodide was formed this resin might perhaps have been dimethylquinine iodide, but it did not appear to be that compound. It dissolved readily in caustic soda and in dilute acids, and undoubtedly contained phenolhydroxyl still unaltered. In any case Dr. Hesse is of opinion that the hydrogen of the phenolhydroxyl present in cupreine offers great resistance to the substitution by methyl.

Dr. Hesse then proceeds to discuss the nature of homoquinine, and in reference to the opinion expressed by Paul and Cownley that the differences presented by it from cupreine and quinine and by the corresponding salts may be taken as indications that homoquinine is a distinct alkaloid, he puts forward the view that these differences may be due to the combination of quinine with cupreine. Hence he thinks that the ready solubility of homoquinine in alcohol and the impossibility of obtaining it from this solution in any other than the amorphous condition is not surprising, and further, that the appearance and behavior of some homoquinine salts also furnish as little evidence of the individuality of homoquinine.

Dr. Hesse considers that cupreine being a diamine base, is therefore biacid, and that it is also in virtue of its phenol nature monobasic. Hence it can combine with two molecules of a monobasic acid, and also with one atom of a metal, such as K or Na. When either of the latter compounds is brought together with an equivalent quantity of quinine hydrochlorate a precipitate is formed that consists essentially of homoquinine.

$$C_{19}H_{21}NaN_2O_2+C_{20}H_{24}N_2O_2,HCl=NaCl+C_{20}H_{24}N_2O_2,C_{19}H_{22}N_2O_2.$$

Dr. Hesse considers that this simple mode of forming homoquinine proves that the substance is only a compound of quinine and cupreine in equal molecular proportions, and he refers to his analytical results as to the amount of quinine in homoquinine as being in harmony with this view.

Lastly, the hydration of crystallized homoquinine has been redetermined by Dr. Hesse, and he finds it amounts to 10·38 per cent. as against 10·19 calculated in accordance with the formula—

$$C_{20}H_{24}N_2O_2,C_{19}H_{22}N_2O_2+4H_2O.$$

—*Pharm. Jour. and Trans.*, January 23d, 1886, pp. 622–625.

A NEW LOCAL ANÆSTHETIC.

At a recent meeting of the Medical Society of Berlin, Dr. Lewin presented a most interesting series of observations upon the physiological effects of a resinous extract obtained from the root of *Piper methysticum*, which is soluble in alcohol, possesses a somewhat aromatic taste, and leaves upon the tongue a sensation of pricking and burning, soon lost in the supervening local insensibility. When the extract, even in very small amount, is instilled into the eye of an animal, a slight local irritation is evidenced by repeated blinking, which soon yields to a marked, enduring, and complete insensibility of the conjunctiva and cornea. In guinea-pigs Lewin has seen this insensibility continue for more than an hour, normal sensation gradually returning. The iris retains throughout its reflex responsiveness to optic stimuli. No anatomical lesions of the cornea or conjunctiva were observed as the result of its application.

When the solution of the extract is injected hypodermically, the tissues with which it comes in contact completely cease to respond to the application of thermic, electric, and chemical stimuli—a transitory condition which is followed by no symptoms of inflammation.

In regard to the constitutional effects produced by the drug upon man, much the same claims are put forward as in the case of coca. When used in moderate amounts, a feeling of comfort, contentment, and rest, with complete retention of consciousness and reason, is said to result. With large doses there is a sensation of dreamy happiness, with an intense desire for sleep; while in excess the infusion causes nausea, headache, paresis of the extremities, nervous trembling, and somnolence. The general effect upon birds, rabbits, and cats is analogous to that produced in man.

It is evident that the drug is of considerable importance, and, if further experience shows that it effects in man the prolonged local anæsthesia that it induces in animals, it will be of great utility in very many operations in minor surgery.—*Med. News*, February 13, 1886.

DERIVATIVES OF SANTONIN.

By V. Villavecchia.

Photosantonic acid, $C_{15}H_{22}O_5$, is best obtained by exposing a solution of 10 grams santonin in a liter of acetic acid (sp. gr. 1·06) to the action of light for about a month; the product is evaporated to a syrupy consistence in a vacuum, the residue washed with water, and then treated with a warm solution of sodium carbonate. The undissolved residue may be dissolved in alcohol, from which it crystallizes in prisms, melting at 182–183°, and of the composition $C_{17}H_{22}O_5$, namely, 1 mol. santonin + 1 mol. acetic acid. On adding hydrochloric acid to the sodium carbonate extract, photosantonic acid separates, and is purified by repeated crystallization from alcohol. Its properties agree with those assigned to it by Sestini (1877). It loses 1 mol. H_2O at 100°, and melts at 154–155°. The composition of its salts indicates that the water lost at 100° is not water of crystallization as assumed by Sestini, but that undried photosantonic acid bears the same relation to the dried acid, as santonin does to santonic acid. Barium and silver photosantonates, $C_{15}H_{20}O_5Ba$ and $C_{15}H_{20}O_5Ag_2$, are described.

Photosantonin, $C_{17}H_{24}O_4$, is best prepared by exposing a solution of santonin (20 grams) in alcohol (1 litre) to the direct action of light for three months. The alcohol is distilled off in a vacuum, and the thick residual oil treated with lukewarm sodium carbonate solution to remove photosantonic acid. On treating the insoluble portion with

ether, two isomeric photosantonins, $C_{17}H_{24}O_4$, are obtained; one modification forms platy crystals, melting at 154–155°, and is dextrorotatory; $[\alpha]_D = +76{\cdot}77°$ for a solution containing 0·3825 gram in 50 c.c. alcohol at 13°. The other modification, which is the chief product, melts at 68–69°, and is identical with Sestini's photosantonin. It is readily soluble in alcohol and ether, and almost insoluble in cold water; $[\alpha]_D = -121{\cdot}6°$ for a solution containing 1·0010 gram in 50 c.c. alcohol at 14°, and $-118{\cdot}4°$ for 1·0980 gram in 50 c.c. alcohol also at 14°. The composition of photosantonin shows that it is not the diethyl salt of photosantonic acid as Sestini assumed, but the monethyl-derivative of dehydrated photosantonic acid, which is regarded as a lactonic acid, thus:—Photosantonic acid, $HO{\cdot}C_{13}H_{19}(COOH)_2$; photosantonic acid dried at 100°, $COOH{\cdot}C_{13}H_{19}\begin{smallmatrix}-O-\\ \diagdown CO\diagup\end{smallmatrix}$; photosantonin, $COOEt{\cdot}C_{13}H_{19}\begin{smallmatrix}-O-\\ \diagdown CO\diagup\end{smallmatrix}$. The last compound may also be obtained from photosantonic acid, alcohol, and sulphuric acid, and by the action of ethyl iodide on the silver salt.

When gaseous hydrogen chloride is passed into a solution of photosantonic acid in absolute alcohol, the diethyl-derivative of an acid containing the elements of a molecule of water less than photosantonic acid is obtained; it is termed *ethyl dehydrophotosantonate*, $C_{13}H_{18}(COOEt)_2$, and forms a colorless liquid, which does not solidify at −10°. A solution of 0·7306 gram in 25 c.c. alcohol has a dextrorotatory power at 20·4°, $[\alpha]_D = +20{\cdot}4°$. The free acid which is isomeric with dehydrated photosantonic acid, melts at 132–133°. It is very readily soluble in alcohol and ether; its dextrorotatory power is $[\alpha]_D = +31{\cdot}9°$ for a solution containing 0·7114 gram in 50 c.c. alcohol. The barium salt, $C_{15}H_{18}O_4Ba$, is very readily soluble.—*Jour. Chem. Soc.*, 1886, p. 73; *Berichte D. Ch. Ges.*, 1885, pp. 2859–2864.

Carbon Disulphide in Neuralgia.—Gasparini (*Gazz. med. Ital-Lomb.*), records 16 cases of neuralgia treated with this remedy, applied locally. Neuralgias from mechanical causes, from malarial infection, and from poisoning by metals, are not under consideration. The cases treated were such as pure facial neuralgia, pleurodynia and sciatica. The method of treatment is as follows:—A small piece of cotton wool on which 10-12 drops of the disulphide have been poured is at once applied to the painful spot, and covered with another piece of cotton wool, which may be held there till the neuralgia is relieved. The pain produced by the application is intense, and the relief obtained is doubtless from the nerve affected being stunned. In some of the cases a permanent cure resulted; in all there was amelioration of the pain.—*Med. Chronicle*, December, 1885, p. 227.

ON NEW PULMONARY MEDICAMENTS.[1]

By Prof. Dujardin-Beaumetz, of Paris, France.
(A Clinical Lecture delivered in Cochin Hospital.)

Gentlemen:—I shall occupy this lecture with a brief consideration of three new pulmonary medicaments: *Euphorbia pilulifera*, *terpin*, and *terpinol*.

The best antiasthmatic medication is surely that of which the basis is iodide of potassium, and when Green in 1860, Aubree in 1864, Trousseau in 1869, and, more emphatically still, Germain Sée in 1878, made known the happy effects of this remedy in the treatment of asthma, they rendered to medicine a signal service; you can, in fact, see any day in our wards cases illustrating the truth of this affirmation.

You know very well how we formulate this treatment; we begin by moderate doses of seven or eight grains and gradually increase them to thirty, forty and even sixty grains a day. I am in the habit of ordering the iodide of potassium to be taken in milk, directing my patients at the same time to drink a great deal of milk during the day. We must, in fact, to prevent accumulation of the medicament favor its elimination by the urine. While continuing the usage of milk, I think that the best vehicle for the administration of iodide of potassium is ale, which, in my opinion, disguises its taste better than anything else. We are in the habit, then, of ordering the patient to take at meal-time, in a tumblerful of bitter ale, a dessertspoonful or a tablespoonful of the following solution:

℞.—Iodidi potassii, - - - - - ℥iij,
Aquæ, - - - - - ℥vj.—M.

I sometimes add to the above tincture of lobelia, in the proportion of two or three fluidrachms to the entire quantity; if, however, the lobelia causes nausea, it must be omitted from the prescription.

Despite all your precautions and all your endeavors to make the iodide palatable and well tolerated, there will be persons who cannot support it, and who cannot take it in the smallest doses without suffering many of the symptoms of iodism. Therefore succedanea to iodide of potassium have been sought for, and among these I must make special mention of *Euphorbia pilulifera*. This plant has been especially studied in our hospital service by Dr. Marsset.[2] Euphorbia pilulifera belongs to the great family of Euphorbiaceæ, which has

[1] Translated, from advance sheets, by E. P. Hurd, M. D., of Newburyport, Mass.
[2] Marsset: On Euphorbia Pilulifera, *Therapeutic Gazette*, Feb., 1885, p. 92; Thèse de Paris, 1884.

furnished to medicine very energetic purgatives, such as croton tiglium and caper spurge; it is an herbaceous annual plant, growing in Brazil and other tropical countries, and in Australia; the specimens which served for our clinical experiments came from Queensland, Australia.

The active principle is an acrid resin which is soluble in water and dilute alcohol. When the aqueous extract or the hydro-alcoholic extract is administered to animals, such as frogs or guinea-pigs, it is observed that in the case of frogs this extract is toxic in the dose of ten to fifteen centigrams, which corresponds nearly to five grams of the dried plant to one hundred grams of the weight of the animal. In the guinea-pig the toxic dose is less; the animal succumbing to a dose of fifty or sixty centigrams of the extract, equivalent to about one gram of the dried plant per one hundred grams of the animal's weight.

When we come to inquire into its physiological effects, we note that it acts chiefly on the respiratory apparatus, and that to a period of acceleration succeeds a period of retardation of the respiratory movements and beatings of the heart; hence, it is probable that this medicine acts directly on the respiratory and cardiac centers.

Dr. Mattheson, in 1884, was the first to call attention to the action of euphorbia pilulifera in the treatment of asthma, and Dr. Tison, of France, was the first to utilize this property in dyspnœas of asthmatic and even of cardiac origin.

From a pharmaceutical point of view you may make use of the following preparations: (1) The hydro-alcoholic extract of the plant, which may be given in the dose of ten centigrams (one and two-thirds grains) a day; (2) or, the decoction, which Dr. Tison directs to be prepared by steeping half an ounce of the dried plant in two quarts of water, the dose to be three or four wineglassfuls a day. (3) I am myself in the habit of using the tincture, of which I give ten drops three times a day. I recommend you to cause this preparation to be taken shortly before meal-time in a cup of some aromatic infusion, such as polygala or wall pellitory. You will thus avoid the local irritant action which characterizes almost all the extracts of this spurge. (4) There exists, lastly, a syrup made by Petit, which contains five centigrams of the extract in each tablespoonful.

In patients suffering from dyspnœa, whether resulting from simple asthma, or from pulmonary emphysema, or even a cardiac affection, euphorbia has sometimes given us good results, but it will not do to

give too large doses, and of the tincture, from five to ten drops, before each of the principal meals, are enough. Notwithstanding all these precautions, you will not be able to keep up this treatment more than a week without interruption, for the patients are apt to experience a burning sensation in the stomach, which results from the local irritant action of the medicament. It is, therefore, chiefly as a succedaneum of iodide of potassium, when the latter cannot be well borne, that you will resort to euphorbia pilulifera.

Terpin and terpinol fulfill indications absolutely different, and are applicable in catarrhs of the lungs. In my *Clinical Therapeutics* I have insisted on the great advantages which may be derived from copaiba in the treatment of pulmonary catarrh, but this medication can have but limited application; for, to say nothing of the repugnance which many patients have toward copaiba, and its unfortunate association in the minds of most people with gonorrhœa (which increases the prejudice against it), there are certain unpleasant physiological effects often attendant on its use, such as eructations, diarrhœa and divers cutaneous eruptions, which militate against the usefulness of this drug.

Therefore, while recognizing how happily copaiba modifies expectoration, it is only in hospital practice that I apply this excellent medicament to the treatment of pulmonary catarrh. I believe that I have found in terpinol a very fortunate substitute for copaiba, and one which offers all the advantages of the latter without any of its disadvantages.

When turpentine is distilled in presence of an alkali, there is obtained a special hydrocarbon having for formula $C_{10}H_{16}$; this is *terebinthene*, which undergoes hydration, and thereupon furnishes a white, solid, crystalline body, which is the *bihydrate of terebinthene*, or *terpin*. This terpin, in presence of an acid, such as sulphuric or hydrochloric, is transformed into an oily body, to which has been given the name of *terpinol*.

Terpin was employed for the first time in therapeutics by Prof. Lepine, of Lyons, and, as a result of experiments on man and animals, he found that this body might be with advantage substituted for turpentine, and that it acted as expectorant and diuretic; his dose of terpin is twenty to sixty centigrams (three to ten grains). We have reproduced in our service the trials of Prof. Lepine, and our pupil, Dr. Guelpa, has interested himself particularly in this undertaking. Terpin presents a real inconvenience in its slight solubility,

requiring, as it does, 200 parts of cold water to dissolve one part of this substance; therefore, it is necessary to have recourse to alcohol in order to obtain active solutions; which is a drawback when one desires to prescribe it for diuretic purposes.

We have given terpin in much larger doses than M. Lepine; we have administered one, two, and even three grams a day without obtaining any well-marked diuretic effect; so, in accordance with Tanret's suggestion, we have substituted terpinol for terpin.

Terpinol is an oily liquid body, which gives forth a very strong odor of tuberose (Polianthes tuberosa), and especially of gardenia (cape jasmine). Adrian has made for me capsules with terpinol, each containing ten centigrams (one and two-thirds grains), and we give our patients six, eight, ten and even twelve of these capsules a day. Terpinol may also be given in pill form, and here we give Tanret's formula, which can hardly be improved upon: Take of terpinol, benzoate of sodium, of each, ten centigrams (one and two-thirds grains), sugar, q. s. for one pill. These pills contain the same quantity of terpinol as the capsules.

We have made several experiments on animals, and have noted:—(1) The rapid elimination by the respiratory passages of terpinol, which long imparts its special odor to the breath; (2) Its feeble elimination by the urine, which also gives forth the odor of terpinol, though much less markedly than the breath.

We then made trials of terpinol in two orders of complaints—pulmonary catarrh and affections of the urinary passages. As might have been foreseen, it was in pulmonary catarrh that we obtained the best results, since it is chiefly by the pulmonary surface that terpinol is eliminated. The sputa become more fluid, their bad odor disappears, and expectoration is facilitated. In affections of the urinary organs, the results have been almost nil. As a diuretic and modifier of the urine, it has shown itself very much inferior to turpentine.

So that if we were to attempt to classify these three substances, turpentine, terpin and terpinol, according to their therapeutic effects, we should say that for the catarrhal affections of the bronchi, terpinol deserves the first place and turpentine the last, while in the case of catarrh of the urinary organs, the order is exactly the reverse. This completes what I have to say at present on the subject of new pulmonary medicaments and antiseptic medications.—*Medical News,* Feb. 20, 1886.

TERPENES.

By O. Wallach.

Pure borneol, prepared by the action of sodium on camphor, melts at 206–207°, not at 198° as generally stated. This compound behaves like a saturated secondary alcohol, but it has the property of uniting with bromine and hydrogen bromide, etc., to form unstable additive products. For example, when bromine is added to a solution of borneol in light petroleum, a crystalline precipitate is deposited, which consists chiefly of *borneol bromide*, $C_{10}H_{18}O{\cdot}Br_2$, mixed with a small quantity of $(C_{10}H_{18}O)_2Br_2$. Cineol, like borneol, unites with bromine in two different proportions, forming compounds which have the same composition as the borneol bromides. When borneol bromide is covered with light petroleum and left for some time in a closed vessel, decomposition ensues resulting in the formation of borneol and borneol hydrobromide, $(C_{10}H_{18}O)_2$,HBr. The same compound is obtained as a white, crystalline powder by the action of hydrogen bromide on a solution of borneol in light petroleum. It is decomposed by water and alcohol.

The *hydriodide*, $(C_{10}H_{18}O)_2$, HI, is a white, crystalline compound, which decomposes spontaneously.

Bornyl chloride, $C_{10}H_{17}Cl$, is easily prepared by adding borneol to a mixture of phosphorus pentachloride and light petroleum. The action is finished in half an hour. The crude product is poured into water, and repeatedly washed. Bornyl chloride is not identical with pinene hydrochloride. It is readily converted into camphene by heating with aniline. Camphene is decomposed by dehydrating agents, such as zinc chloride and strong sulphuric acid, or by the action of heat alone. In each case the decomposition products are liquid. Monobromocamphene is obtained as an oily liquid when bromine is added to a solution of camphene in alcohol and ether.

Camphene is formed by the action of dehydrating agents on borneol, but the hydrocarbon cannot be isolated (except when potassium pyrosulphate is the dehydrating agent) as it is decomposed by zinc chloride or phosphoric anhydride or strong sulphuric acid.

The so-called hydrocarbon "*borneen*," which Pelouze (*Annalen*, xl, 327), Kachler (*ibid.*, clxiv, 78), and Oppenheim (*Jour. Chem. Soc.*, 1874, 891) obtained by the action of phosphoric anhydride on borneol, is a mixture of the decomposition products of camphene.

The author confirms Tilden's statement (*Trans.*, 1878,80 and 251), that Russian and Swedish oil of turpentine contain the same constituents, namely, australene, sylvestrene, and dipentene. The hydrocarbon obtained by decomposing sylvestrene chloride with aniline closely resembles sylvestrene, but the identity of the bodies is not proved. The hydrocarbons yield a chloride melting at 72°, and a liquid bromide.

"*Terpinol*" described by Wiggers (*Annalen*, lvii, 252), and by List (*ibid.*, lxvii, 367), does not exist.

Terpin hydrate, $C_{10}H_{20}O_2+H_2O$, melts at 117°. It is a saturated compound, and is decomposed by boiling with acids or dehydrating agents, yielding terpineol, $C_{10}H_{18}O$, and other products. When a mixture of 1 part of sulphuric acid and 2 of water is used, terpineol, terpinene, $C_{10}H_{16}$, and terpinolene are formed. When very dilute sulphuric acid is used, the chief product is turpinene. Dilute phosphoric acid and glacial acetic acid on the other hand yield terpineol as the principal product. Terpin hydrate is almost completely converted into dipentene by prolonged treatment with potassium pyrosulphate.

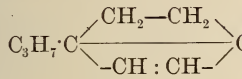
Terpineol, $C_{10}H_{17}OH$, is a nonsaturated monatomic alcohol. It is a thick liquid, boiling at 215°, and is sparingly soluble in water. It unites with bromine to form an unstable bromide.

Dipentene tetrabromide, melting at 124°, is formed by the action of an excess of bromine on terpineol. The hydroxyl in terpineol is easily replaced by chlorine or iodine, yielding for example the chloride, $C_{10}H_{18}Cl_2$, melting at 50°, and the iodide melting at 77°. Terpineol unites with carbanil, forming phenylterpinylurethane, which crystallizes in white needles melting at 110°. Boiling with dilute acids, or treatment with dehydrating agents, converts terpineol into terpene or dipentene, but if terpineol is left at the ordinary temperature in contact with dilute sulphuric or hydrochloric acid, it unites with water, forming terpin hydrate, $C_{10}H_{20}O_2+H_2O$.

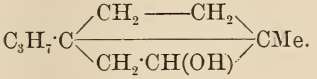
Terpin has the same boiling point as dipentene, but the two compounds are not identical, as the former yields a liquid bromine-derivative. Terpin is formed by the inversion of pinene with alcoholic sulphuric acid.

Terpinolene has not yet been obtained in a pure state. It boils between 185° and 190°, and yields an unstable tetrabromide crystallizing in monoclinic plates.

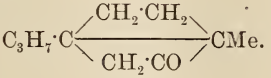
The relation between camphene, borneol, and camphor is shown by the following formulæ:—



Camphene.



Borneol.



Camphor.

Borneol bears the same relation to camphene that terpineol does to dipentene.—*Jour. Chem. Soc.*, 1886, p. 70; *Annalen*, ccxxx, p. 225-272.

MANGANESE OCCURRING IN PLANTS.

By Professor Flückiger.

It is well known that manganese is widely spread throughout the vegetable kingdom, although it always occurs in very small amount. No doubt there are certain plants provided with the power of absorbing the said metal, whilst others would appear to be unable to assimilate manganese. It is true that much more striking facts of a similar order are to be noticed with regard to iodine. Among marine plants there are none superior to the *Laminariæ*, which are so well known as an important source for iodine, or at least were so for a long time. I have ascertained that 5 grams of *Laminaria Cloustoni* (or *L. hyperborea*) are quite sufficient for demonstrating the presence of iodine in its tissue. The drug is repeatedly boiled with water, the decoction concentrated to a few c cm. and mixed with alcohol in order to precipitate the mucilage. From the filtrate the alcohol is to be distilled off, when the residual liquid, on addition of ferric chloride, yields undoubted traces of iodine to bisulphide of carbon, with which the mixture is to be vigorously shaken. Carrageen, which would also be available in considerable quantities for manufacturing iodine, has never been resorted to for that purpose, and that for good reasons. Carrageen is not able to take up iodine from the water of the ocean. This may likewise be demonstrated by the experiment just mentioned; if much more than 5 grams of carrageen are treated in the same way as laminaria, no iodine at all will be found.[1]

[1] See also Stanford's exhaustive papers on the subject, *Pharm. Journal*, xiii (1883), 1019, 1037; xiv (1883 and 1884), 353, 1051; also Wheeler, *Ibid.*, xii (1882), 642. See also Amer. Jour. Phar. (1882), p. 124; (1883), pp. 612, 618; (1884), p. 582.

In a paper of mine[2] I stated that the plants of the natural order Zingiberaceæ are remarkable for the manganese which is to be met with in every part of at least most of those plants. The smallest fragment of cardamoms or of their capsule yields an ash of intensely green color, due to manganates. Other seeds or fruits which I examined in the same way proved free of manganese.

Yet there is another plant particularly remarkable in that respect, viz., the curious *Trapa natans*, L., an annual herb growing in a limited number of localities in several parts of continental Europe. It lives in a very interesting way on the bottom of swamps, from which at the flowering time the leaves rise to the surface of the water. Gorup-Besanez[3] has shown that *Trapa natans*, especially its fruit, is comparatively rich in manganese although it grows in water containing only an extremely small amount of that metal. Like *Laminaria* in the case of iodine, *Trapa natans* is possessed of the singular power of assimilating manganese which it wants from the water. It would be interesting to submit the plant under notice to experiments in order to ascertain whether it can perfectly succeed without manganese, and to investigate whether other plants living in the same water as *Trapa* likewise absorb manganese.

The seeds, *i. e.*, the cotyledons, of the "water nut," *i. e.*, *Trapa natans*, are eaten in Upper Alsatia and the neighboring districts of France as well as in Northern Italy; they were in prehistoric times, in all probability, an item of the food of the inhabitants of the palafittes (Pfahlbauten) of Switzerland. The most characteristic fruit of *Trapa* is abundantly met with in the remains of those prehistoric settlements, thus showing, in the opinion of some botanists,[4] that *Trapa natans* is to be comprised among the species which are on the way to die out. A recent monograph[5] on *Trapa natans*, however, is by no means in favor of such a theory, considering that in olden times swamps were much more abundant in Europe. Consequently the conditions for the growth of *Trapa* were then much more favorable than they are in our days.

There are, strangely enough, two species of the same genus in the East, playing a most important part in the food of the Indian and

[2] *Pharm. Journal*, iii (1872), 208.

[3] Liebig's *Annalen der Chemie und Pharmacie*, cxviii (1861) p. 223.

[4] Christ, *Das Pflanzenleben der Schweiz*, Zürich, 1879, p. 55, 180, 424, 432.

[5] Täggi, *Die Wassernuss, Trapa natans*, Zürich, 1883, pp. 34, 40.

Chinese population. *Trapa bispinosa*, Roxburgh, indigenous in Bengal and the Peninsula, in the Punjaub as well as in Cashmere, yields enormous quantities of a most valuable contribution to the provisions of the people throughout India,[6] where the plant is also largely cultivated.

And as to China and Japan, *Trapa bicornis*, L. fil., is even much more important to a very large number of the lower people than *Tr. bispinosa* is in India. *Trapa bicornis* abounds in canals and shallow lakes, in localities which are the permanent residence of, probably, millions of Chinese. An excellent figure of the hard fruit of the Chinese species will be found in the 'Science Papers' of my lamented friend, Daniel Hanbury, p. 241.

Now I thought it well worth investigating the presence or absence of manganese in the Asiatic *Trapa*. A few fruits of *Trapa bicornis*, not from China proper, but from the mouth of the river Amur, were examined at my request, in my laboratory, by Mr. Lojander. He immediately succeeded in demonstrating the presence of manganese in the ash of the fruits with which he had been supplied. *Trapa natans* and *Tr. bicornis* being thus proved to be eminently "manganophile" (or manganophage) species, there can be little doubt as to the intermediate *Tr. bispinosa*, which I am sorry not to have at my command; it will very likely also be found to yield manganate if it is treated in the same way as pointed out in my first paper.[7]

Manganese, it is true, is very widely distributed throughout the vegetable kingdom, yet, certainly, by no means uniformly. The plants alluded to in this paper are prominently remarkable for their affinity to that metal.—*Pharm. Jour. and Trans.*, January 23d, 1886, p. 621.

Strassburg, Germany.

THE DETECTION OF METHYLATED ETHER.

By Henry Williams Jones, F.C.S.

Ether prepared from methylated spirit commences to boil at a much lower temperature than ether obtained from rectified spirit; and by such difference the two varieties may be discriminated.

By fractional distillation, the first distillate being several times fractionated, as little as 10 per cent. of methylated ether may be found when mixed with pure ether.

[6] See also Drury, 'Useful Plants of India,' 2nd edition, 1873, p. 430.

[7] *Pharm. Jour*, iii (1872), 208.

In pharmaceutical preparations in which methylated ether is present, it can also be detected, though the presence of alcohol interferes with the process, and more care is requisite than in merely deciding whether a sample of ether is methylated or not.

A convenient apparatus consists of a Glyusky's distillation tube (with a thermometer) attached to a flask heated by a water-bath, and connected with a Liebig's condenser, the source of heat being a burner of small size, so that the water in the bath may be slowly heated.

The following table exhibits results obtained with an arrangement of this description, by adopting a process of limited fractional distillation; and removing the graduated tube in which the distillate was collected at the moment the thermometer indicated 90° F. The lighter portions of methylated ether carry over much heavier ether, which considerably augments the volume of the distilled portion.

The results are, obviously, in no sense quantitative, being dependent on the particular samples and apparatus employed. They serve, however, to show the modifying influence of pure ether and of rectified spirit.

100 c.c. of each taken.	C.c. obtained.	
Rectified ether specific gravity ·720.....	0	
" " " " ·730.....	0	
Methylated ether specific gravity ·717..	60·	Boiled freely at 74° F.
" " " " ·720..	54·	
" " " " ·730..	23·	
Rectified (·735) and methylated (·730) equal parts.....	7·	After cooling and again heating, a further 5 c.c. obtained.
Sp. Ætheris B.P.		
(Rectified spirit and methylated ether (·730)).....	4·5	
Tr. Lobeliæ Æther.		
(Rectified spirit and methylated ether (·730)).....	4·5	
Collodium B.P.		
(Rectified spirit and methylated ether (·730)).....	6·0	

Whilst it is easy to detect ordinary methylated ether, it is clearly impossible to determine in the case of a liquid of correct boiling point, whether such a sample has been prepared, as the British Pharmacopœia directs, from rectified spirit, or separated by careful fractional rectification from ether originally made from methylated spirit.—*Pharm. Jour. and Trans.*, Feb. 6, 1886, p. 663.

ON THE SPECIFIC GRAVITY OF SULPHUROUS ACID GAS IN SOLUTION.

By B. Gilles and A. Shearer.

The authors have made numerous determinations to ascertain the specific gravities of aqueous solutions of sulphurous acid gas (SO_2), and the percentages of that substance contained therein. Their results are as follows:

Spec. Grav.	Tem.	SO_2 in 100 pts.	Spec. Grav.	Tem.	SO_2 in 100 pts.
1·0051	15·5° C.	0·99	1·0399	15·5° C.	8·08
1·0102	"	2·05	1·0438	"	8·68
1.0148	"	2·87	1·0492	"	9·80
1·0204	"	4·04	1·0541	"	10·75
1·0252	"	4·99	1.0597	12·5° C.	11·65
1·0297	"	5·89	1·0668	11·0° C.	13·09
1·0353	"	7·01			

The authors in conclusion state that when the determinations at 15·5° C. and 760 mm. pressure were made, the specific gravity was increased in the proportion of 0·005 for every augmentation of 1 part in 100 of the quantity of sulphurous acid gas.

This last statement is a most important confirmation of the results of previous experiments; and if Scott's determinations at 15° C. and Hager's at 17·5° C. (See *National Dispensatory*, 3d edit, p. 102) be placed under this rule, a curious uniformity of comparative results will be observed. *Annali di Chim. Med. Far.*, 1885, p. 244; *Jour. Soc. Chim.*, iv., p. 303. J. W. E.

DOUBLE NITRATES OF SILVER AND THE ALKALIS.

By A. Ditte.

When a solution containing silver and potassium nitrates is slowly concentrated, potassium nitrate at first crystallizes alone, but as soon as the liquid contains at least 3 mols. of silver nitrate for each mol. of potassium nitrate bulky, transparent, right rhombic prisms are formed. These prisms are highly modified and have the composition $AgNO_3,KNO_3$. This double salt is always formed when a solution of the two nitrates contains so much of the silver salt that both nitrates can crystallize simultaneously. If the double salt is treated with water, the silver nitrate is gradually removed.

Rubidium nitrate yields a strictly analogous double salt, and in all probability cæsium nitrate will behave in the same way.

If a solution of silver and ammonium nitrates is gradually concen-

trated, the silver salt, being less soluble, crystallizes alone, but after a time the double nitrate $AgNO_3,NH_4NO_3$, separates in crystals similar to those of the potassium compound. This double salt is easily obtained whenever the mixed solutions contain an excess of the ammonium salt.

Rose stated that a solution of silver and sodium nitrates containing an excess of the former, first yields crystals of silver nitrate only, and afterwards crystals of the double nitrates $AgNO_3,2NaNO_3$; and $AgNO_3,4NaNO_3$. The author finds that when the silver nitrate is in excess, this salt crystallizes alone in its ordinary form, but as soon as sodium nitrate begins to separate also, the two salts crystallize together, and the crystals take the ordinary form of sodium nitrate. Whatever the original composition of the solution, the composition of the crystals and the mother-liquor varies continuously, however, and no definite compounds are formed. From this result it follows that silver nitrate is dimorphous, and that one of its forms is isomorphous with sodium nitrate, but the author has not been able to obtain pure silver nitrate in rhombohedrons.

Lithium nitrate crystallizes below 10° in prismatic needles containing $5\,H_2O$, and if a mixture of silver and lithium nitrates is allowed to crystallize at this temperature, the two salts crystallize separately. Above 15°, however, lithium nitrate forms anhydrous crystals similar to those of sodium nitrate, and if a solution of silver and lithium nitrates is concentrated at this temperature, the two salts crystallize together in rhombohedrons, but the composition of the crystals and the mother-liquor varies continuously as in the case of sodium nitrate.—*Jour. Chem. Soc.*, 1886, p. 122; *Compt. rend.*, ci, p. 878–881.

The effects of alcohol, of beer, of black coffee, of tobacco, of salt, and of alum, on digestion.—Dr. Carl Bikfalvi (*Pester med. chir. Presse*), thus sums up the conclusions he has arrived at by experimental research: (1) Alcohol slows the natural digestion even in small amounts. It hinders the conversion of dextrin into grape sugar less than it does the digestion of albumins. (2) Beer, even in small amount, does not assist digestion. (3) Wine in small amount does not injure digestion, and may even help it; large quantities delay digestion. (5) Black coffee in small quantities stimulates digestion, in large quantities hinders it. (6) Tobacco extract has no appreciable effect on artificial digestion. (7) Small quantities of common salt assist digestion, larger amounts considerably retard it. (8) Alum hinders digestion, and, even in very small amounts, arrests the conversion of dextrin.—*Med. Chronicle*, December, 1885, p. 230.

ANNATTO.*

By William Lawson.

The subject which I have the honor to bring shortly before your notice this evening is one that formed the basis of some instructive remarks by Dr. Redwood in November, 1855, and also of a paper by Dr. Hassall, read before the Society in London in January, 1856, which latter gave rise to an animated discussion. The work detailed below was well in hand when Mr. MacEwan drew my attention to these and kindly supplied me with the volume containing reports of them. Unfortunately they deal principally with the adulterations, while I was more particularly desirous to learn the composition in a general way, and especially the percentage of coloring resin, the important constituent in commercial annatto. Within the last few years it was one of the articles in considerable demand in this part of the country; now it is seldom inquired for. This certainly is not because butter coloring has ceased to be employed, and hence the reason for regretting that the percentage of resin was not dealt with in the articles referred to, so that a comparison could have been made between the commercial annatto of that period and that which exists now. In case some may not be in possession of literature bearing on it—which, by the way, is very meagre—it may not be out of place to quote some short details as to its source, the processes for obtaining it, the composition of the raw material, and then the method followed in the present inquiry will be given, together with the results of the examination of ten samples; and though the subject doubtless has more interest for the country than for the town druggist, still, I trust it will have points of interest for both.

Annatto is the coloring matter derived from the seeds of an evergreen plant, *Bixa Orellana*, which grows in the East and West Indian Islands and South America, in the latter of which it is principally prepared. Two kinds are imported, Spanish annatto, made in Brazil, and flag or French, made mostly in Cayenne. These differ considerably in character and properties, the latter having a disagreeable putrescent odor, while the Spanish is rather agreeable when fresh and good. It is, however, inferior to the flag as a coloring or dyeing agent. The seeds from which the substance is obtained are red on the outside, and two methods are followed in order to obtain it. One is to rub or wash off the coloring matter with water, allow it to subside, and to expose it to spontaneous evaporation till it acquires a pasty consistence. The other is to bruise the seeds, mix them with water and allow fermentation to set in, during which the coloring matter collects at the bottom, from which it is subsequently removed and brought to the proper consistence by spontaneous evaporation. These particulars, culled from Dr. Redwood's remarks, may suffice to show its source and the methods for obtaining it.

Dr. John gives the following as the composition of the pulp surrounding the seeds: Coloring resinous matter, 28; vegetable gluten, 26·5; ligneous fibre, 20; coloring, 20; extractive matter, 4; and a trace of spicy and acid matter.

It must be understood, however, that commercial annatto, having undergone processes necessary to fit it for its various uses, as well as to preserve it, differs

*Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, January 21st.

considerably from this, and though it may not be true, as some hint, that manufacturing in this industry is simply a term synonymous with adulterating, yet results will afterwards be given tending to show that there are articles in the market which have little real claim to the title. I tried, but failed, to procure a sample of raw material on which to work with a view to learn something of its character and properties in this state, and thus be able to contrast it with the manufactured or commercial article. The best thing to do in the circumstances, I thought, was to operate on the highest priced sample at disposal, and this was done in all the different ways that suggested themselves. The extraction of the resin by means of alcohol—the usual way, I believe—was a more troublesome operation than it appeared to be, as the following experiment will show: One hundred grains of No. 8 were taken, dried thoroughly, reduced to fine powder, and introduced into a flask containing 4 ounces of alcohol in the form of methylated spirit, boiled for an hour—the flask during the operation being attached to an inverted condenser—filtered off, and the residue treated with a smaller amount of the spirit and boiled for ten minutes. This was repeated with diminishing quantities until in all 14 ounces had been used before the alcoholic solution ceased to turn blue on the addition to it of strong sulphuric acid, or failed to give a brownish precipitate with stannous chloride. As the sample contained a considerable quantity of potassium carbonate, in which the resin is soluble, it was thought that by neutralizing this it might render the resin more easy of extraction. This was found to be so, but it was accompanied by such a mass of extractive as made it in the long run more troublesome, and hence it was abandoned. Thinking the spirit employed might be too weak, an experiment with commercial absolute alcohol was carried out as follows: One hundred grains of a red sample, No. 4, were thoroughly dried, powdered finely, and boiled in 2 ounces of the alcohol, filtered, and the residue treated with half an ounce more. This required to be repeated with fresh half ounces of the alcohol until in all 7½ were used, the time occupied from first to last being almost three hours. This was considered unsatisfactory, besides being very expensive, and so it, also, was set aside, and a series of experiments with methylated spirit alone was set in hand. The results showed that the easiest and most satisfactory way was to take 100 grains (this amount being preferred as it reduces error to the minimum), dry thoroughly, powder finely, and macerate with frequent agitation for twenty-four hours in a few ounces of spirit, then to boil in this spirit for a short time, filter, and repeat the boiling with a fresh ounce or so; this, as a rule, sufficing to completely exhaust it of its resin. Wynter Blyth says that the red resin, or bixin, is soluble in 25 parts of hot alcohol. It appears from these experiments that much more is required to dissolve it out of commercial annatto.

The full process followed consisted in determining the moisture by drying 100 grains at 212° F. till constant, and taking this dried portion for estimation of the resin in the way just stated. The alcoholic extract was evaporated to dryness over a water-bath, the residue dissolved in solution of sodium carbonate and the resin precipitated by dilute sulphuric acid (these reagents being chosen as the best after numerous trials with others), added in the slightest possible excess. The resin was collected on a tared double filter paper, washed with distilled water until the washings were entirely colorless, dried and weighed.

The ash was found in the usual way, and the extractive by the difference. In

the ash the amount soluble was determined, and qualitatively examined, as was the insoluble portion in most of them.

The results are as follows:

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Moisture .	21·75	21·60	20·39	69·73	18·00	18·28	15·71	38 18	19.33	22 50
Resin . .	3·00	2.90	1·00	8·80	3·00	1·80	5·40	12·00	5·90	9 20
Extractive.	57·29	59·33	65·00	19·47	58.40	65·67	26·89	20·82	23·77	28·50
Ash . . .	17.96	16·17	13·61	2·00	20·60	14·25	52·00	29·00	51 00	39·80
	100 00	100·00	100 00	100·00	100·00	100 00	100·00	100·00	100·00	100·00
Ash . . .				Almost						
Soluble . .	13·2	12 57	7·5	wholly	10·	11·75	18·5	20·0	15·	13·8
Insoluble .	4 76	3·6	6·11	NaCl.	10·6	2·5	33·5	9·0	36·	26·

The first six are the ordinary red rolls, with the exception of No. 4. which is a red mass, the only one of this class direct from the manufacturers. The remainder are brown cakes, all except No. 7, being from the manufacturers direct. The ash of the first two was largely common salt; that of No. 3 contained, besides this, iron in some quantity. No. 4 is unique in many respects. It was of a bright red color, and possessed a not disagreeable odor. It contained the largest percentage of moisture and the lowest of ash; had, comparatively, a large amount of coloring matter; was one of the cheapest, and in the course of some dairy trials, carried out by an intelligent farmer, was pronounced to be the best suited for coloring butter. So far as my experience goes, it was a sample of the best commercial excellence, though I fear the mass of water present and the absence of preserving substances will assist in its speedy decay. Were such an article easily procured in the usual way of business there would not be much to complain of, but it must not be forgotten that it was got direct from the manufacturers—a somewhat suggestive fact when the composition of some other samples is taken into account. No. 5 emitted a disagreeable odor during ignition. The soluble portion of the ash was mostly common salt, and the insoluble contained three of sand—the highest amount found, although most of the reds contained some. No. 6 was a vile looking thing, and when associated in one's mind with butter, gave rise to disagreeable reflections. It was wrapped in a paper saturated with a strongly smelling linseed oil. When it was boiled in water and broken up, hairs, among other things, were observed floating about. It contained some iron. The first cake, No. 7, gave off during ignition an agreeable odor resembling some of the finer tobaccos, and this is characteristic more or less of all the cakes. The ash weighed 52 per cent., the soluble part of which, 18·5, was mostly potassium carbonate with some chlorides and sulphates; the insoluble, mostly chalk with iron and alumina. No. 8—highest priced of all—had in the mass an odor which I can compare to nothing else than a well rotted farmyard manure. Twenty parts of the ash were soluble and largely potassium carbonate, the insoluble being iron for the most part. The mineral portions of Nos. 9 and 10 closely resembled No. 7.

On looking over the results it is found that the red rolls contained starchy matters in abundance (in No. 4 the starch was to a large extent replaced by water), and an ash, mostly sodium chloride, introduced, no doubt, to assist in its preservation as well as to increase the color of the resin; a well-known action of salt on vegetable reds. The cakes, which are mostly used for cheese coloring, I believe, all appeared to contain turmeric, for they gave a more or less

distinct reaction with the boric acid test, and all except No. 8 contained large quantities of chalk. The results in reference to extractive, etc., reveal nothing that has not been known before. Wynter Blyth, who gives the only analysis of annatto I have been able to find, states that the composition of a fair commercial sample (which I take to mean the raw article) examined by him, was as follows: water, 24·2; resin, 28·8; ash, 22·5, and extractive, 24·5; and that of an adulterated (which I take to mean a manufactured) article: water, 13·4; resin, 11·0; ash (iron, silica, chalk, alumina and common salt), 48·3, and extractive, 27·3. If this be correct, it appears that the articles at present in the market, or at least those which have come in my way, have been wretched imitations of the genuine thing, and should, instead of being called adulterated annatto, be called something else adulterated, but not seriously, with annatto. I have it on the authority of the farmer previously referred to, that ¼ of an ounce of No. 4 is amply sufficient to impart the desired cowslip tint to no less than 60 lbs. of butter. When so little is actually required, it does not seem of very serious importance whether the adulterant or preservative be flour, chalk, or water, but it is exasperating in a very high degree to have such compounds as Nos. 3 and 6 palmed off as decent things, when even Nos. 1, 2 and 5 have been rejected by dairymen as useless for the purpose. In conclusion, I may be permitted to express the hope that others may be induced to examine the annatto taken into stock more closely than I was taught to do, and had been in the habit of doing, namely, to see if it had a good consistence and an odor resembling black sugar, for if so, the quality was above suspicion.—*Phar. Jour. and Trans.*, January 30, 1886, p. 645.

VARIETIES.

Nitroglycerin has been successfully employed by Dr O. T. Shultz, of Mount Vernon, Ind., in a severe case of hiccough. One drop of a one per cent. solution of nitroglycerin was given every hour at first, the time being gradually extended. On the second day after commencing this treatment permanent relief was obtained —*Amer. Practitioner*, 1885.

Cannabis Indica is recommended by Dr. H. L. Jones as a hypnotic in cases where sleeplessness is accompanied by delirium. The extract is given in pills in doses of 2 or 3 grains every four or six hours. Frequently one dose was found to be sufficient. Hallucinations were complained of only in one case.—*Amer. Practitioner*, 1885.

Oil of Sassafras, in teaspoonful doses, has been found serviceable by Dr. T. J. Miller, of Roanoke, Va., in neuralgia, the patients also becoming cheerful and exhilarated.—*Va. Med. Monthly*, Jan., 1886.

Dr. J. Bartlett, of Chicago (*Chic. Med. Jour. and Exam.*, Dec., 1885), directs attention to the oxytocic effects of sassafras tea, and to the narcotic action of excessive doses of oil of sassafras.

Cocaine in Whooping Cough.—Dr. Moncorvo recommends mopping of the upper part of the larynx first with a one per cent. solution of resorcin, and,

subsequently, with a 10 per cent. solution of cocaine hydrochlorate, the latter application to be repeated more frequently.—*Lancet*, 1885.

Dr. Barbillon (*Rev. des Mal. de l'Enf.*) has used in a similar manner, but without resorcin, a five per cent. solution of cocaine hydrochlorate from two to four times a day. The duration of the disease does not appear to be shortened, but the paroxysms of coughing are considerably diminished and vomiting is arrested.

Atropine in doses of $\frac{1}{120}$ grain has been used by Dr. R. Gray in acute coryza with the effect of relieving the headache, reducing the temperature and diminishing the discharge.—*Med. News*, 1885.

Tupelo in Dilatation of the Uterine Cervix.—Ménière regards the tupelo root as preferable to sponge or laminaria for the following reasons:

1. Tupelo acquires its maximum degree of expansion in less than an hour and a half, while sponge and laminaria require from six to seven hours.

2. Its surface remains soft, pliable, and spongy, and in extracting it there is no danger of injury to the mucous membrane.

3. It returns with facility to its former size and shape, and may be used several times if subjected to disinfection in mercuric chloride after each operation.—*Gaz. de Gynécologie*, Jan. 1, 1886. *Med. News.* See also *Amer. Jour. Phar.*, 1883, p. 631.

MINUTES OF THE PHARMACEUTICAL MEETING.

The fifth meeting of the present series was called to order by the actuary, and Mr. Clement B. Lowe was elected chairman.

The minutes of the last meeting were read, and, there being no corrections required, they stand approved.

The actuary presented for Messrs. W. T. Baker & Co., of this city, on behalf of Messrs. Parke, Davis & Co., of Detroit, a cabinet of Materia Medica Specimens, arranged for the use of pharmacy and medical students. The thanks of the meeting were voted for this donation.

The actuary presented the Year-Book of Pharmacy for 1885, which work is issued by the British Pharmaceutical Conference, and represents to English pharmacists what the Proceedings of the American Pharmaceutical Association do to Americans; and also the Calendar of the Pharmaceutical Society of Great Britain for 1886. This work contains a calendar showing the dates of the examinations, meetings of council, legal holidays, times for opening and closing museum and library, and other matters of general interest to the society and trade; a sketch of the origin of the society, the charter, the various acts bearing upon pharmacy, the by-laws, list of officers, members, associates both those in business and not in business, registered apprentices or students of the society, regulations of the board of examiners, centers at which examinations are held, and a large amount of other information of interest to the trade and those intending to enter it.

Mr. Bullock exhibited a specimen of *Terpin*, a stearopten possessing medical properties similar to those of oil of turpentine. This is a hydrate of oil of turpentine, having the composition $C_{10}H_{20}O_2+H_2O$, it crystallizes in transparent

prismatic needles, fuses at about 100° C., losing its water of crystallization, and sublimes undecomposed at a higher temperature; it is sparingly soluble in cold water, more so in hot water, and is freely soluble in alcohol, ether and acetic acid. Its alcoholic solution will bear considerable dilution with water without precipitation of the terpin. Wiggers states that it may be prepared by adding two parts of nitric acid 1·25 to 1·30 to eight parts of oil of turpentine and one part of alcohol, sp. gr. 863, shaking the mixture well for several days, then setting aside at a temperature of 68° to 78°, for the terpin to crystallize. Its dose is about 3 to 6 grains (see AMER. JOUR. PHARM., 1885, p. 293).

Hydro-naphthol was also shown by Mr. Bullock. Under this name an article has lately been introduced as an antiseptic for surgical dressings. Naphthol, $C_{10}H_7OH$, is a derivative of napthalene, $C_{10}H_8$, by the substitution of one molecule of hydroxyl for one of the hydrogen atoms in the naphthalene. When naphthalene is heated with sulphuric acid, two isomeric sulphonaphthalic acids are formed, called alpha and beta sulphonaphthalic acids; if the heat is carried to 160° C., the product is almost entirely beta sulphonaphthalic acid; by heating sulphonaphthalate of potassium with potassium hydroxide, two forms of naphthol are obtained, called alpha and beta naphthol. Hydronaphthol, as it appears in the market, is a gray powder of a micaceous appearance, and a faint odor resembling naphthalene, it fuses between 113° and 118° C., at 126° C. gives off vapor and commences to sublime at 130° C., and sublimes completely between 140° and 145° C., giving a product of small, colorless rhombic plates; it commences to boil at 260° and the boiling point is almost constant at 280° C. A dark carbonaceous residue is left after sublimation. From these properties the so-called hydronaphthol appears to correspond with beta naphthol in an impure condition. It dissolves in 100 parts of hot water, which after cooling retains in solution about 1 part in a thousand. It is freely soluble in alcohol, ether, benzol and the alkalies; alkaline solutions are said to impair the antiseptic qualities of the article.

Prof. Trimble exhibited specimens of the root of *Yerba del Indio*, a Mexican remedy for colic, and used in the arts for tanning. This sample was sent from Texas by Mr. H. J. Schuchard, a graduate of this college. When first received it was in the green state and was very astringent, but after drying it had lost much of its astringency and was attacked by insects. Mr. S. S. Jones, of the present class, experimented with it, and it was from his work that the facts were ascertained described in the paper read by Prof. Trimble (see page 113). Prof. Maisch stated that some ten years since Mr. Voelcker examined a root called *Raiz del Indico*, and found it to contain chrysophanic acid and other principles, present in certain polygonaceous roots; this root was very similar to the specimens exhibited, but was smaller.

Prof. Maisch exhibited to the meeting specimens, sent by Prof. Soubeiran, of very slender *ergot*, with the inflorescence of a large grass, called *diss* by the Arabs of Algeria, upon which the ergot had grown.

Prof. Maisch also exhibited specimens of *assahy* and *bacaba,* palmseeds, sent from Brazil to Mr. Louis Dohme of Baltimore, and made the following statements: *Assahy or assay* is the Brazilian name for Euterpe edulis, *Martius*, the young shoots of which and of some allied species are used as pot-herbs; the fruit bruised and macerated with water, yields a wine-colored filtrate, which, mixed with sugar, furnishes an agreeable refrigerant beverage. A butyraceous

oil, known as *assahy butter*, is stated to be prepared from Euterpe oleracea, *Martius*, which plant is known as *jussára* or *jissara*, a name also given to the former species, according to some authors.

Bacaba is Oenocarpus Bacaba, *Martius*, the mucilaginous fruit of which is largely used for food by the natives of Brazil; the decoction deposits a sediment, which, on being dried in the sun, becomes very hard, and in this condition may be preserved for a long time, but on softening it in water furnishes a nutritious food. The seeds of this palm and of Oenocarpus distichus, perhaps also of Ol. Patawa, *Martius*, yields a fixed oil known as *comou butter*, which is used for the manufacture of soap and of candles, and for culinary purposes.

Among what may be termed the curiosities of the trade, the actuary exhibited a mass of stone, weighing 55 lbs., which was taken from a case of *Corigliano licorice*, in which it had been packed for the purpose of increasing the weight; such a wholesale fraud it was thought should be traced back to its authors, as it was most deliberately done.

Mr. A. M. Todd, of Nottawa, Mich., was introduced by Prof. Trimble, and, in response to an invitation, proceeded to give to the meeting some of the results of his experience in the manufacture of *oil of peppermint* and *menthol;* he being largely engaged in that industry.

The process for the distillation of oil of peppermint in use in this country, and which has entirely superseded the old process, was introduced about twenty-five years ago, and consists of using wooden vessels, steam being driven through the herb placed on false bottoms; the vessels are of such capacity that fifty tons of herb per diem of twenty-four hours can be worked off. When the fresh herb is distilled, it requires generally an hour to obtain all the oil; but if it has been partially dried, thirty minutes will suffice to accomplish the purpose. Formerly it was the common practice to allow the water of the distillate to run to waste, and this occasioned an enormous loss of oil; now, after the oil has been collected from the distillate, this is again used to steam through the herb, and, as it is already charged with all the oil it will hold in solution, it effects a great saving in the process. The condensation is effected by passing the distillate which is drawn off from the body of the still through a five-inch pipe into a number of copper pipes, tinned inside, and these are connected with block tin worms, two inches in diameter and one hundred feet long, connected with the receivers. The first portions of the distillate are more limpid than those which are drawn off afterward, and the last portion is more resinous and bitter.

To obtain the *menthol*, the vessel, which he calls the container, has an inner vessel for the purpose of refrigerating the oil, and is surrounded also with a wooden refrigerating vessel. In the container is a valve above the bottom from which to draw off the uncongealed oil. The oil will, in rare instances, furnish crystals without artificial cold, but generally a mixture of ice and salt is used for refrigeration, by which a temperature of —8° F. is obtained. However, some specimens of oil from certain localities congeal at 24° F., this being about the highest temperature at which the natural oil from true peppermint has been observed to crystallize. The mass of crystals at first more resemble paraffin than regular crystals, but if care is taken to remove the fluid portion while a low temperature is maintained, the crystalline formation is more distinct, and will remain solid at about 110° F. The crystals formed towards the close of the process are harder and firmer. The commercial crystals are finer and still have

some of the oil adherent, but the pure and perfect crystals are more free from oily matter. When the oil is reduced to zero, the yield of menthol crystals is about twenty per cent. of the oil subjected to the process, but varies, and, strange as it may seem, the specific gravity of the oil has changed but one one-thousandth from its original density. So far as observation has gone no difference in therapeutic value or power has been noticed between the crystals and the liquid portion of the oil, when a *pure* oil is compared with it. As a rule, the oils produced in Michigan are of good quality, the farmer being careful of the character of the crop; some lots of oil have been observed containing as much as forty per cent. of alcohol. The first portion of the distillate obtained in rectification is inodorous, and at —8° F. yields no menthol, while the last portion is extremely odorous and is also destitute of menthol, but the temperature at which the separate fractions boil has not been tabled. In fractioning 400 lbs. of pure, natural oil of ·915° sp. gr. in twenty pound fractions, extremely interesting results were obtained as to the variations in specific gravity, but not having his memoranda at hand, Mr. Todd could not state the changes with sufficient exactness. The first fraction was obtained in about 30 minutes, the last required six hours.

Professor Maisch inquired whether the first or inodorous portion was as useful as the middle or aromatic portion, which one would seem to regard as more desirable.

Mr. Todd replied that he had never investigated the therapeutic action of the first or light portion separately, yet he did not consider it as valuable by itself for all the purposes for which the united fractions were useful, though it may contain some distinct and valuable properties peculiar to itself. He has recently undertaken the study of these fractions in their physical aspects, and it would also be interesting to determine their therapeutic relations. The true characteristics of pure essential oils seem not to have been determined and laid down in the books with sufficient exactness, and their study affords a field for the most fruitful research.

Mr. Bullock moved, and it was seconded, that the thanks of the meeting were due and should be tendered to Mr. Todd for his very interesting remarks upon oil of peppermint and menthol with which he had favored the meeting. This was unanimously adopted.

There being no further business, on motion adjourned.

T. S. Wiegand, *Registrar.*

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APRIL, 1886.

XANTHORRHIZA APIIFOLIA, *L'HERITIER.*

By Samuel S. Jones, Ph. G.

(Abstract of an Inaugural Essay.)

The rhizome reduced to a No. 80 powder contained 10·64 per cent. moisture and yielded 1·70 per cent. ash, of the latter 0·90 was soluble in water, 0·62 soluble in HCl, and 0·18 insoluble in either; it contained potassium, calcium, magnesium and iron, with carbonic, sulphuric and phosphoric acids.

The proximate analysis gave the following results:

Soluble in petroleum spirit	·015	
Volatile oil		·009
Resin soluble in absolute alcohol		·006
Soluble in stronger ether	1·300	
Resin with traces of alkaloid		1·300
Soluble in absolute alcohol	1·320	
Resin soluble in chloroform, benzol, etc		·660
Alkaloids		·280
Other organic compounds		·300
Inorganic matter		·080
Soluble in distilled water	6·100	
Mucilage and albumen		·070
Dextrin, etc		·130
Glucose		·250
Saccharose		·990
Other organic matter		3·940
Inorganic matter		·720
Soluble in solution of sodium hydrate (.2 per cent.)	4·250	
Mucilage and albumen		2·190
Other organic matter		1·460
Inorganic matter		·600
Soluble in dilute hydrochloric acid (1 per cent.)	8·250	
Starch and other compounds		7·830
Inorganic matter		·420
Loss by treatment with chlorine water	12·345	12·345
Residue remaining	65·180	65·180
Loss	1·240	1·240
	100 —	100 —

The alcoholic resin was purified by repeated solution in alcohol and precipitation with water, when it had the consistence of Burgundy pitch, melted at 74° C. and dissolved at 50° C. in all proportions of absolute alcohol. At 15·5° C. one part of resin dissolved in 23 parts alcohol, 2·6 parts chloroform, 10·5 parts benzol, 78 parts carbon disulphide, 1200 parts petroleum spirit, and in 6 parts solution of potassa (5 per cent.). In contact with camphor, a rather soft mass is produced, which becomes harder on standing. The resin has a neutral reaction; its taste is rather pungent, with a slight bitterness, probably due to adhering alkaloid.

The alcoholic extract freed from resin gave with potassio-mercuric iodide a precipitate equivalent to 0·28 per cent. of alkaloids. Precipitated by acids the following amounts of berberine were obtained: with picric acid ·14, with sulphuric acid ·09, with hydrochloric acid ·10 per cent. After various methods had been tried for the separation of the alkaloids, the following results were obtained: The alcoholic tincture of 350 gms. of the drug was concentrated to 200 C c., mixed with excess of sulphuric acid, and set aside for twelve hours at between —2° and —3° C. The filtrate from the impure berberine sulphate was freed from alcohol by evaporation, poured into water to separate resin, the filtrate precipitated with ammonia and the precipitate purified by washing, solution in sulphuric acid, precipitation by ammonia, solution in alcohol, treatment with animal charcoal, and evaporating. The residue treated with chloroform gave a resin-like mass which could not be crystallized, and which, dissolved in acidulated water, gave alkaloidal reactions with platinic chloride, gold chloride and potassio-mercuric iodide, and the aqueous solution, evaporated, did not give the characteristic color reactions of berberine with Frœhde's reagent, sulphuric acid, sulphuric and nitric acids, nitric acid or chlorine water with hydrochloric acid. These results show the absence of berberine and the presence of a second alkaloid in the solution obtained as above.

The aqueous extraction of the drug, on being mixed with 2 parts of alcohol, precipitated mucilage and albumen; after concentration and precipitation with 4 parts of alcohol, dextrin, etc., was obtained; glucose was estimated by Fehling's solution, and saccharose by the same test-liquid, after boiling the liquid with hydrochloric acid and deducting the glucose previously found.

FOLIA PIMENTÆ.

By William Warner Abell, Ph.G.

(Abstract of an Inaugural Essay.)

The leaves of Eugenia Pimenta are petiolate and vary somewhat in shape and size, but are usually about four inches long, elliptical, entire, blunt or obtusely pointed, veined, of a shining green color, and have an astringent and aromatic taste.

On distilling 448 gm. of the ground leaves with water for 36 hours, the distillate treated with ether yielded only half a fluidrachm, or rather less than ½ per cent. of volatile oil, resembling that of Myrcia acris. The estimation of tannin was attempted by precipitating the concentrated infusion with basic lead acetate, decomposing the precipitate with hydrosulphuric acid and evaporating, which gave 0·417 per cent. The ash amounted to 11·25 per cent, one-eighth of which was soluble in water.

The following pharmaceutical preparations were made:—

Abstractum Pimentæ foliorum. Prepared by the pharmacopœial process for abstracts; it is of a light-green color and has a strong odor of pimenta.

Extractum Pimentæ foliorum fluidum. Experiments made with alcohol, alcohol (2 parts) and water (1 part), and with diluted alcohol, with and without the addition of glycerin, lead to the conclusion that diluted alcohol is the best menstruum, yielding a dark-colored, almost black fluid extract, having a strong, pungent taste of pimenta and fully representing the virtues of the leaves.

Extractum Pimentæ foliorum. Using alcohol as the menstruum, 7·5 per cent. of a dark-colored, oily extract was obtained; and with diluted alcohol, 12·5 per cent. The latter was of a pilular consistence, dark brown, and had the strong odor and taste of the drug.

Tinctura Pimentæ foliorum. Strength: 12 in 100. Menstruum used: alcohol 85 and water 15 parts. The reason for choosing a stronger alcoholic menstruum for the tincture than for the fluid extract is not stated.

Trochisci Pimentæ foliorum, containing 1 gram of the extract in 30 troches, have a fine aromatic and astringent taste.

Populin, a bitter principle obtained from the bark of white poplar, or "quaking aspen," and other species of Populus, is said to act like a charm in painful micturition and scalding. The dose ranges from two to four grains.—*Med. World.*

SYRUPUS AURANTII.

By George M. Beringer, Ph. G.

(Read at the Pharmaceutical Meeting, March 16th.)

The U. S. Pharmacopœia directs that syrup of orange should be made from the sweet orange peel, using only the outer layer (epiderm) containing the oil cells, which should be carefully grated or cut with a sharp knife from the inner white layer of parenchyma. The officinal formula directs that five (5) parts of the epiderm thus procured should be macerated for seven days with five (5) parts of alcohol, and then express the liquid; the expressed liquid then to be rubbed up with one (1) part precipitated phosphate of calcium and thirty (30) parts of water gradually added, and then filtered, adding enough water through the filter to make the liquid weigh forty (40) parts, in which dissolve sixty (60) parts of sugar.

Carefully following these directions and using a tincture-press, I have never been able to procure more than from one-and-a-half to two parts of liquid from the five parts of alcohol used, the remainder of the menstruum being absorbed and retained by the orange peel. That this portion of one and a half parts or so, expressed, should represent all the flavoring or virtue of five parts of orange peel, seems, at the least, to be ridiculous, and that the portion from three to three and one-half parts, retained, should not be recovered, could certainly not have been the intention of the revisers of our national standard. If expression is the process of extraction to be used, then the peel should, after the first expression, be again macerated with 3 parts of alcohol and a second time expressed.

Maceration, followed by percolation, answers all the requirements of the Pharmacopœia. I would suggest the following modification of the officinal formula:

Take of sweet orange peel, grated or cut from the inner white layer, five parts (5); alcohol, a sufficient quantity; precipitated phosphate of calcium, one part (1); sugar, sixty parts (60); water, a sufficient quantity to make one hundred parts. Macerate the orange peel in five (5) parts of alcohol for seven days, then pack in a percolator, and allow the percolation to proceed slowly. Reserve the first two parts that come through, then add more alcohol and continue the percolation till six (6) parts more are obtained. Evaporate this, at a temperature not exceeding 120° F., to three (3) parts, and add to the reserved portion. Rub this up with the precipitated phosphate of calcium and

then with thirty (30) parts of water gradually added and filter, adding enough water through the filter to make the liquid weigh forty (40) parts, in which dissolve the sugar by agitation.

The writer is aware that the syrup of orange thus made requires considerable time and trouble, for the separation of the epiderm from the white layer is rather a tedious operation. I am also aware that many pharmacists—I almost said *most*—prepare this syrup from the fluid extract supplied by manufacturers. The fluid extract made from the ground peel yields a syrup which is anything but officinal. In the interest of accurate pharmacy (for pharmacy should be as exact a science as mathematics), this simple preparation should be as carefully prepared as confection of senna, blue mass, or any of the more difficult pharmaceutical preparations.

It has been proposed to use for this syrup the peel carefully grated from the fruit in place of the dried peel. I exhibit, herewith, two samples of syrup thus made, the one merely substituting an equal amount of the fresh peel for the dried of the officinal formula. In the other, an allowance is made for the moisture which, in several determinations, amounted to seventy per cent. on air drying. Consequently $16\frac{2}{3}$ parts were used in place of 5 parts for the officinal syrup.

GLEANINGS FROM FOREIGN JOURNALS.

By George H. Ochse, Ph. G.

Incompatibility of Antipyrin and Spirit of Nitrous Ether.—According to Eules sweet spirit of nitre and antipyrin are incompatible owing to the formation of an aniline.—*Pharmaceutische Rundschau*, xxii, p. 70.

Preservation of Raspberry Juice.—Raspberry juice can be preserved by adding 20 gms. of salicylic acid to 100 liters of juice, also by the addition of 15 per cent. of 96 per cent. alcohol. Salicylic acid is preferable to alcohol for several reasons. When the juice is preserved with alcohol it soon loses its bright red color, turning violet, and gradually acquires a strong ethereal odor, losing in this way the natural aroma, whilst juice preserved with salicylic acid retains its natural color and odor and yields a clear syrup when boiled with sugar.—*Pharm. Rundschau*, xii, p. 82.

Stable Corrosive Sublimate Soap.—Unna in an article on medicinal soaps stated that a stable soap of corrosive sublimate would be of great value to physicians. Owing to the rapidity with which mer-

curic chloride is decomposed by soap it is very difficult to make a soap which would answer the purpose. According to Geissler a stable soap can be made by mixing corrosive sublimate with soap containing an excess of fatty acid (not fat). If the soap contains an excess of alkali dark spots appear and gradually get larger until the soap turns black and lastly silver-gray. This does not occur in soap made as Geissler suggests, hence, color can be considered a criterion of efficacy. Prof. Johne experimented with a 1 per cent. corrosive sublimate soap and found it to be a powerful disinfectant.

Poisoning by Benzin.—An adult took 12–13 gms. of benzin (benzol?) in mistake for brandy. Ten or fifteen minutes after taking it the patient became insensible and died 17½ hours afterward from asphyxia. —*Pharm. Rundschau,* xii, p. 110.

To generate a steady stream of Laughing Gas.—Kaemmerer proceeds as follows: In a Woulff bottle are placed some strips of copper, and the bottle is filled about one-third full with a cold saturated solution of nitrate of sodium, to which concentrated sulphuric acid is very gradually added. The flow of gas is regulated by the quantity of sulphuric acid added, care being taken not to have the mixture too warm.—*Pharm. Rundschau,* xii, p. 110.

Novel use for Paraffin.—Paraffin dissolves in ether and ethereal oils, but not in alcohol. Coltelloni takes advantage of this in distilling alcohol. The vapors are passed through molten paraffin before condensing, which takes up the fusel oil, and pure alcohol condenses. —*Pharm. Rundschau,* xii, p. 131.

Diluent for Exsiccated Narcotic Extracts.—Soluble starch, made by boiling 1000 parts of potato starch with 5000 parts of water and 20 parts of oxalic acid until the mixture becomes clear, then neutralizing with chalk, is recommended as a diluent for narcotic extracts. Powdered soluble starch resembles gum arabic, is soluble in water and contains but a trace of glucose.—*Pharm. Rundschau,* xii, p. 89.

According to Hoffmann, borax precipitates *morphine* in long acicular crystals. The borax solution is added until the morphine solution contains from 3 to 4 per cent. of borax—after 20–25 minutes the crystals of morphine can be separated, washed and weighed—*Phar. Rundschau,* xii, p. 69.

Indelible inks.—Richmond states that indelible inks which are not affected by acids, can be made as follows: *Dark-blue*=3 parts ferro-

cyanide of potassium, 2 parts concentrated aqua ammoniæ, 2 parts tartaric acid and 240 parts of water are mixed, the solution filtered and 160 parts ammonio-citrate of iron, 40 parts aqua ammoniæ, 8 parts aniline-blue and 70 parts of gum arabic are added. *Black ink* is made by adding 20 parts of pyrogallic acid to the above. These inks being non-corrosive, can be used with an ordinary pen.—*Phar. Centralhalle*, xxvii, p. 74.

Artificial Vanillin is prepared in Milan from olivil (the resin obtained from the olive tree) by treating an alkaline solution of the resin with potassium permanganate. When the reaction ceases, an excess of sulphuric acid is added. The vanillin thus formed is extracted by steam or by shaking with ether.—*Phar. Centralhalle*, xxvii, p. 74.

Hopeine.—Hopeine an alkaloid (?) discovered by Williamson in uncultivated American hops, and recommended by him as a substitute for morphine and quinine, has been manufactured by the Concentrated Produce Co. (limited), and Christy, both of London. The product sent out by the former has been examined by Petit, Ladenburg and Müller and found to be an aromatised morphine. Bardet states that the crystalline forms of hopeine and morphine are identical. Hopeine gives the same reactions as morphine when treated with tannin, picric acid and mercuric chloride. The hop odor is not characteristic of the alkaloid; when an acid solution is precipitated with ammonia the precipitate is destitute of odor. Gebe & Co. were unable to discover any hopeine in German hops.—*Pharmaceutische Post*, xix, p. 138.

Germanium a new element.—Clemens Winkler discovered in argyrodite—a silver ore—a new element resembling arsenic in color and lustre, yet less volatile than antimony; when sublimed, it yields crystals totally different from antimony. Pure germanium sulphide is a snow-white mass, soluble in ammonia. Germanium chloride is more volatile than antimony chloride, and yields a white precipitate with sulphuretted hydrogen in acidified solution.—*Pharmaceutische Post*, xix, p. 140.

Pulverization of Boracic Acid is readily accomplished by agitating a hot saturated solution with an egg-beater until cold. When the solution is cold small microscopic crystals will be found at the bottom of the vessel; these are pressed between folds of filtering-paper, and while yet damp triturated in a mortar.—*L'Union Pharmaceutique*, xxvii, p. 53.

Unguentum Diachylon.—From the large number of formulas for ointments containing lanolin as the base, which have been published in German journals, the following for diachylon ointment are selected as examples:

1. Lead plaster, 50; olive oil, 20; lanolin, 30. Mix.
2. Lead plaster, 45; lanolin, 45; lard, 10. Mix.

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

By the Editor.

(Concluded from page 127.)

Trompetilla is the name given to Bouvardia angustifolia, B. hirtella, B. Jacquini, *Kunth*, and other indigenous species of Bouvardia (Rubiaceæ). The decoction of the leaves is popularly believed to be a cure for hydrophobia; but this property has not been confirmed by clinical observation. (See also Amer. Jour. Phar., 1874, p. 51.)

Valeriana de México, Valeriana mexicana, *De Cand.;* Valerianaceæ; in the Mexican valley. The root is met with in sections or fleshy disks, about 4 Cm. or more in diameter, or in voluminous pieces; externally yellowish brown, internally yellowish; odor strong, unpleasant; taste bitter, somewhat acrid. It contains sufficient valerianic acid to be economically prepared from the root, which is used as a substitute for the European valerian in doses of 1 to 5 gm.

Venenillo, Asclepias linearis, *Cavanilles;* Asclepiadaceæ; in the Mexican valley. The milk juice is a violent and dangerous cathartic. The seed hairs, impregnated with a solution of ferric chloride and well dried, are used as a hæmostatic.

Violeta del país, Sida triloba, *Cavanilles,* Malvaceæ. The flowers are emollient.

Yedra (Hiedra) terrestre. This name belongs properly to the European Glechoma hederacea, *Lin.;* but in Mexico is also applied to the following plants, having very different properties: Pharbitis violacea, *Boj.* (manto de la Vírgen), Hydrocotyle americana, *Lin.* (sombrerillo de agua), Cobœa scandens, *Cav.* (hiedra morada), and more commonly to Sida triloba, *Cav.*, and a species of Malva.

Yerbabuena is Mentha viridis, *Lin.*

Yerbabuena piperita, Mentha piperita, *Lin.* Analogous properties are contained in Hedeoma piperita, *Bentham,* which is frequent in the Mexican valley.

Yerba del alacran, Plumbago scandens, *Lin.;* Plumbaginaceæ; in hot and moist localities. The leaves, externally applied, are caustic, and taken internally, emetic, dangerous. The root is caustic and purgative.

Yerba del ángel, Eupatorium Collinii, *De Cand.*, E. sanctum, *Flor. Mex. ined.;* in the mountains of Guadalupe Hidalgo. The leaves are popularly used in atonic diarrhœa and as an antiperiodic, and are fraudulently used in the manufacture of beer.

Yerba de las ánimas, Helenium autumnale, *Lin.* The flowers and fruit are errhine, and have been used as a substitute for arnica. (See also AMER. JOUR. PHAR., 1872, pp. 308, 522, and 1874, p. 221.) The same common name is also given to Ipomœa orizabensis, *Ledanois.*

Yerba del burro is an undetermined species of Spigelia, the leaves and seeds of which are poisonous.

Yerba del cancer, Lythrum alatum, *Pursh*, L. vulnerarium, *Schrank*, L. lanceolatum, *Elliot*, and L. album, *Kunth* (Lythraceæ); also Gomphrena procumbens, *Fl. Mex. ined.* (Amaranthaceæ). The leaves of these plants, in cataplasms and in decoction, are vulnerary and are used in cancerous ulcers.

Yerba del carbonero, Baccharis Alamani, *De Cand.*, B. multiflora, *Humboldt et Bonpland*, B. jalapensis, *H. B.*, B. heterophylla, *H. B.*, and other indigenous species of Baccharis are diaphoretic, the infusion of the leaves being popularly used for the cure of catarrhs.

Yerba del clavo, Juliana caryophyllata. *La Llave;* Zygophyllaceæ; in Tlalpam, etc. The infusion of the leaves is antispasmodic.

Yerba de la cucaracha, a species of Echites; in Cuernavaca. The powder of the leaves and stem, mixed with sugar, is effectual for destroying cockroaches.

Yerba del cura, Ternstrœmia altamirania, *Schiede;* in hot and damp regions. Baths made from the leaves are used against rheumatism and gout.

Yerba de la doncella, Begonia gracilis, *Kunth*, also B. tuberosa *Fl. Mex. ined.*, Begoniaceæ. The root is emetic and cathartic.

Yerba dulce, Lippia graveolens, *Kunth*, and L. dulcis, *Treviranus;* Verbenaceæ. The infusion is demulcent, pectoral and emmenagogue. (See also AMER. JOUR. PHAR., 1885, p. 333.)

Yerba de la golondrina, Euphorbia maculata, *Lin.;* in the Mexican valley, also in the United States. The juice is used for removing spots from the cornea, and the decoction as a lotion for skin dis-

eases. The plant is sometimes erroneously substituted for Chelidonium majus, *Lin.*

Yerba del indio, Aristolochia foetida, *Kunth.*—See Amer. Jour. Phar. (1876), p. 49, and (1886), pp. 113 and 115.

Yerba mora; Solanum nigrum, *Lin.* Not used internally; the decoction in fomentation and vaginal injections.

Yerba de la mula, Monnina Ocampi, *Herrera, Mendoza et Villada;* Polygalaceæ; in Huasteca, etc. The leaves are commonly regarded as tonic, and the fruit is used for dyeing linen violet-blue.

Yerba del negro, Malva angustifolia, *Cavanilles.* The plant is emollient.

Yerba del pastor, Acalypha prunifolia, *Kunth;* Euphorbinceæ; near Puebla, Mexico, etc. The decoction is vulnerary.

Yerba del pollo, Commelyna tuberosa, *Kunth;* Commelynaceæ. The juice, leaves and stems are efficient hæmostatics. The extract is given in pills, or from 1 to 6 gm. dissolved in 180 gm. of water; for vaginal injections and topical application 4 to 8 gm. of the extract are used. Tradescantia erecta, *Cav.* T. geniculata, *Jacquin* and allied species have similar properties in a less degree.

Yerba del porrazo or del golpe, Oenothera pumila, *Fl. Mex. ined.* The decoction is used as a resolvent in contusions.

Yerba de la Puebla, Senecio canicida, *Fl. Mex. ined.;* Compositæ; in the State of Puebla. Roots yellowish white, branched; stem originating from a bulb, cylindric, shaggy, with linear, longitudinal violet spots; leaves alternate, deeply pinnatifid; inflorescence corymbose; heads heterogamous, yellow, radiate; akenes cylindric, not hairy. Rio de la Loxa found in the plant a poisonous organic acid, *senecic acid.* The plant has been recommended as antipsoric and sudorific; it has tetanic properties and has been used in epilepsy; in Puebla it is used for killing dogs.

Yerba de San Nicolás, Ionidium angustifolium, *Kunth,* Violaceæ; in Tamaulipas. The root is tortuous, thin, whitish-gray or yellowish, slightly annulate, somewhat resembling white ipecac; meditullium yellowish; inodorous; taste farinaceous, afterward acrid. It has, among the rural population, considerable reputation for the cure of dropsy.

Yerba de Santa María de México is feverfew, Matricaria Parthenium, *Lin.*

Yerba de Santa María de Tierradentro, Tagetes lucida, *Cavanilles,* is antiperiodic.

Yerba del sapo, Eryngium amethystinum, *Lin.*, E. comosum, *Laroche*, E. Cervantesii, *Lar.*, E. subacaule, *Cavanilles*, and other indigenous species of Eryngium; Umbelliferæ. The roots are considered to be diaphoretic and emmenagogue.

Yerba del tabardillo, Piqueria trinervia, *Cavanilles;* Compositæ; in the Mexican valley, Puebla, etc. The infusion of the plant is stimulant and febrifuge.

Yerba de la víbora, Y. viperina, Myriadenus tetraphyllus, *De Cand.;* Leguminosæ; in the State of Jalisco, in Jamaica, etc. The gum produced from this plant is antiperiodic.

Yerba del zopilote, Acourtia moschata, *De Cand.;* Compositæ; in Morelia. Used as a tonic and stomachic. Perezia moschata, *La Llave et Lejarza*, is known by the same common name.

Yerba del zorrillo, Croton dioicum, *Cavanilles;* Euphorbiaceæ; in the Mexican valley, Acatzingo, etc. The seeds resemble ricinus seeds, are flattened on one side, convex on the other, 3 or 4 Mm. long, smooth, glossy, black mottled with gray, carunculate, the episperm hard and brittle, the endopleura very thin, but distinct. Morales (Thesis, 1872) found in the seeds 29 per cent. of fixed oil, albumen, gum, resin, etc. The emulsion of the seeds is drastic, and, according to Dr. Mucio Maycote, the fixed oil may be advantageously used in place of croton oil. The root is likewise drastic in doses of 2 gm.

Yesgos del país, Urtica mexicana, *Fl. Mex. ined.;* in temperate districts. The root is used as a diaphoretic and as a substitute for Sambucus Ebulus, *Lin.*

Yolochiahitl, Psoralea glandulosa. *Lin.;* Leguminosæ; in hot and damp regions, in Chile, etc. The infusion of the leaves is vermifuge, and used externally as a vulnerary; the root is emetic.

Yoloxochitl or laurel tulipan, Magnolia mexicana, *Mociño et Sessé;* in Morelos and other states. The flowers which appear in March, contain, according to Mendoza and Herrera, volatile oil, resin, quercitrin, tannin, etc. The infusion of the fresh flowers is antispasmodic, and the tincture of the fresh flowers is used as a tonic.

Yoyote or narciso amarillo, Thevetia Iccotli, *De Cand.;* Apocynaceæ; in the hot and damp regious of the western slope. According to Herrera, the seeds contain non-drying oil, protein compounds, extractive and the toxic principle tevetosin (see paper by Prof. Herrera in *Amer. Jour. Phar.* 1877, p. 145). The poisonous properties of yoyote are generally known, but the drug has not yet been employed

medicinally. The experiments of Dr. Hidalgo Carpio upon different animals have shown that tevetosin is a very active poison in doses of 0·05 gm., and that it acts as a violent emetic and paralyzes the respiratory and other related muscles. The seeds bruised and kneaded together with suet, are popularly employed for the cure of piles—a dangerous remedy.

Zábila, Aloe variegata, *Lin.;* Liliaceæ, in S. Angel, etc. The juice of the leaves is drastic and anthelmintic, and, according to Prof. F. Llamas, contains barbaloin, bitter resin, volatile oil, albumin, gum, etc.

Zacatlascale, Cuscuta americana, *Lin.;* Convolvulaceæ. Aperitive and laxative; also used for dyeing yellow.

Zanahoria, the cultivated root of Daucus Carota, *Lin.;* for emollient cataplasms.

Zapote blanco, Casimiroa edulis, *La Llave et Lejarza;* in Central Mexico. The fruit is anthelmintic and comestible.

Zapote borracho, Lucuma salicifolia. *Kunth;* Sapotaceæ; in Morelos. The fruit is comestible and is supposed to possess soporific properties; the seeds are used in pleurisy.

Zapote prieto, Diospyros obtusifolia, *Willdenow;* Ebenaceæ; in Cuernavaca and other hot districts. The leaves are astringent, the bark is antiperiodic and the fruit comestible.

Zapotillo, Sapota Achras, *Miller;* Sapotaceæ; in hot and moist localities. The bark is antiperiodic, the fruit alimentary, and the seeds are used as a diuretic and are believed to be poisonous. The plant yields a substance resembling gutta percha which is known as "chicle vírgen," and is used as a masticatory and for filling carious teeth.

Zaragatona, the seeds of Plantago Psyllium *Lin.;* mucilaginous.

Zarzamora, Blackberry. The leaves are astringent.

Zarzaparrilla. In the city of Mexico the roots of Smilax medica, *Schlechtendal,* are exclusively employed.

Zazale, Mentzelia hispida, *Willdenow;* Loasaceæ; in the Mexican valley, etc. The root is a pretty efficient drastic; the decoction is taken as an antiblennorrhagic. Jáuregui found in it a dark brown bitter resinous acid, fat, gum, sugar, starch, etc.

Zedoaria. Rarely used in medicine.

Zempoalxochitl, Tagetes erecta *Lin,;* Compositæ. The flowers are stomachic, febrifuge, anthelmintic and aperitive; the fruit is purgative and vermifuge. The plant contains volatile oil and probably the same principles which have been found by Latour in Tagetes patula,

Lin.; namely a coloring matter called *cuercetagetin*, red coloring matter, uncrystallizable sugar, pectin, wax, resin and salts.

Zopatle, Montagnæa tomentosa, *De Cand.*, and M. floribunda, *La Llave et Lejarza;* Compositæ; in the Mexican valley, the second species also in Real del Monte and in Tlalpujahua. The first species has the stem cylindrical, striate and with gray and white spots underneath the tomentum; the leaves 13 Cm. long and 7 Cm. broad, triangular-oval, subcordate, triplinerved and toothed. The second species has a villous-pubescent stem and deltoid-oval and subdentate leaves. F. Altamirano found in the plant albumin, gum, fat, extractive, resins, a neutral brown-yellow bitter principle, and a peculiar acid, soluble in water and alcohol, and producing yellow precipitates with lead salts. The juice of the plant and the decoction are popularly used for producing contraction of the womb.

Zumaque venenoso, Rhus Toxicodendron *Lin.* The dose of the powdered leaves is given as being 0·20 to 0·60 gm. per day; but the dried leaves are stated to be unreliable, while the fresh ones are dangerous; the tincture prepared from the fresh leaves is to be preferred for medical use.

THE PRESENCE OF POTASSIUM NITRITE IN THE POTASSIUM HYDRATE OF COMMERCE.[1]

By Professor Wyndham Dunstan.

The object of this paper is to draw attention to a prevalent, though hitherto unnoticed, impurity in certain specimens of the potassium hydrate of commerce. In consequence of having observed unusual reactions with a solution of potash I was led to make a complete examination of the specimen from which it had been prepared. This had been obtained from a well-known wholesale house, and was cast in sticks having a light green tint. The aqueous solution after being acidulated with pure dilute sulphuric acid copiously liberated iodine from potassium iodide. This in itself is not of course sufficient evidence of the presence of a nitrite, but that the reaction was actually due to this impurity was proved by the effect on ferrous sulphate and by the evolution of ammonia when a strong aqueous solution was boiled with metallic zinc, as well as by other tests for nitrous acid. The quantity of potassium nitrite present was estimated by titrating

[1] Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, March 10, 1886.

the acidified solution with potassium permanganate. In the specimen it was found to amount to 1 per cent. This quantity, although small, is of medical and pharmaceutical importance on account of the powerful therapeutic action of the alkaline nitrites. Other commercial specimens were then examined, and in all cases appreciable quantities of potassium nitrite were detected and estimated with the following result:

Specimen	A	contained	1·0	per cent. of	KNO_2
"	B	"	0·74	"	"
"	C	"	0·56	"	"
"	D	"	0·47	"	"
"	E	"	0·34	"	"

The specimens also contained nitrate, about 4·5 per cent. of chloride, silica and alumina; they contained on an average 78-79 per cent. of total alkali.

Without knowledge of the previous history of these specimens, it is impossible to make any definite statement about the origin of the potassium nitrite. It might result from the deoxidation of the nitrate by heat, or possibly from the oxidizing action of fused potash on an organic compound containing nitrogen.

It is important that the potassium hydrate and the salts prepared therefrom for medicinal purposes should be free from nitrite, and I therefore mention that which I have found to be the most ready method of applying the potassium iodide reaction for its detection. Working on the usual lines, the solution and acidification of the substance cause the evolution of much heat, and unless special precautions are taken loss of nitrous acid occurs. The best method consists in adding a little solution of potassium iodide to about an ounce of diluted sulphuric acid, preferably contained in a flask. To this about half a stick (5 grams) of potash should be added, and the flask rapidly rotated, when iodine will be liberated, and color the liquid from a yellow to a reddish-brown, depending on the quantity of nitrite present. The estimation of the nitrite is most conveniently conducted with about the same quantity of potash dissolved in water and acidified without rise of temperature with pure diluted sulphuric acid. Further, it should be added that since potassium nitrite is insoluble in alcohol the potassium hydrate which is purified by solution in alcohol and known in commerce as " potash by alcohol " is free from this impurity.—*Phar. Jour. and Trans.*, March 13. 1886, p. 778.

BISMUTHI CITRAS, WITH AN IMPROVED FORMULA FOR THE PREPARATION OF LIQUOR BISMUTHI ET AMMONII CITRATIS.[1]

By Peter MacEwan,
Pharmaceutical Chemist.

Whatever may be said against the new process for the preparation of liquor bismuthi, no one will deny that it is an honest attempt to get rid of the objectionable features of the old liquor, which was a very different thing from its prototype. Unless in strength, which is still very much over the mark, the formula given under *Liquor Bismuthi et Ammonii Citratis* is all right, provided we have a pure citrate to begin with. Therein lies the difficulty, for the official process for the citrate is almost unworkable, and, however modified, does not give a pure ammonia-soluble citrate.

I have no personal experience of the commercial citrate, but since the publication of the new Pharmacopœia I have had numerous inquiries regarding it. The first inquirer had used a pint of ammonia solution for 800 grains of citrate, and yet did not obtain a perfect solution; it was milky and a portion of the citrate was untouched.

This complaint has been repeated by others, and some who have tested the citrate report the presence of nitrate in it, and so on. There have also been many complaints about the process, and it is these more particularly which have induced me to make this inquiry. No doubt manufacturers will see that they send out a pure article, and thus arrest further complaint; but there is a growing tendency amongst retail pharmacists to manufacture odd chemicals. Whether this is the outcome of better chemical knowledge or lack of business I am not prepared to say, though probably both have an influence. Be that as it may, the desire to manufacture on the small scale deserves encouragement, and surely the fountain-head of this encouragement ought to be our national Pharmacopœia. But in this case it is not so, the official process for the preparation of a few ounces of citrate of bismuth is the opposite of encouraging.

Already Mr. Stephenson has recorded his disappointment, and my results corroborate his to the full. If 11 ounces of nitric acid be used to dissolve the bismuth, water may be added to the solution *ad infinitum* without arriving at the critical point; with 6 ounces of acid

[1] Read at a meeting of the Edinburgh Chemists' Assistants and Apprentices' Association.

from 4 to 5 gallons of water are required, and with less acid the bismuth is apt to crystallize out before water can be added. Mr. Stephenson's objection is alone fatal to the process, but I believe the principle of it to be also bad. The official aim is to bring the bismuth as near as possible to the basic state before adding the alkaline solution. What could be more unreasonable? We require a normal citrate and try for an oxycitrate! I have obtained a citrate free from nitrate, yet not wholly ammonia-soluble, and this I take to be due to oxycitrate, the reaction between the basic nitrate and the oxycitrate being—

$$3\ BiONO_3 + H_3C_6H_5O_7 = (BiO)_3C_6H_5O_7 + 3\ HNO_3.$$

In this case this is a subordinate reaction, no doubt, but the nature of the process favors it.

We have the same error of principle in Rother's process, now in the U. S. Pharmacopœia. In this process bismuth subnitrate, citric acid and water are boiled together. Here, also, though the subnitrate undergoes complete decomposition, the product is not entirely ammonia-soluble. I have tried repeatedly, but cannot get the desired result by this process, and others in whom I have much confidence have had the same experience.

It was expected, owing to the introduction of oxide of bismuth into the 1874 Addenda, that Wood's process would have been adopted, and Mr. Umney even takes the new process as Wood's, but it is not so. In Wood's process bismuth oxide, preferably fresh, is dissolved in a mixture of solution of ammonia and ammonium citrate. This is a distinct advantage over the old process, but it has an objection, viz., an excess of ammonium citrate, which we know to be unnecessary.

In a paper by M. Méhu (see Am. Jour. Phar., 1873, p. 541), we have a process which is all that can be desired. M. Méhu dissolves crystallized bismuth ternitrate in a strong solution of citric acid, saturates one-half of the mixture with ammonia, then adds the other half of the mixture, when normal bismuth citrate is precipitated. By this process, slightly modified, I have had admirable results. The citrate is precipitated in a bulky condition, and when dried on bibulous paper in a hot air oven, it is obtained in light and milk-white flakes, and forms with ammonia a bright, almost water-white solution, there not being a particle of insoluble residue. Méhu brings the process forward ostensibly for the direct preparation of the liquor, but as his paper does not contain other than approximate quantities, I give a formula for a pint of the liquor.

Take of—

Subnitrate of bismuth,	1 ounce and 180 grains.
Citric acid,	1 ounce and 60 grains.
Nitric acid,	1½ fluid ounces.
Solution of ammonia, Distilled water,	of each a sufficiency.

Heat the subnitrate of bismuth with the nitric acid until the salt has dissolved and the solution has acquired the appearance of a syrup; with this mix the citric acid previously dissolved in an ounce of water by the aid of heat; divide the solution into two equal portions, and to one portion add solution of ammonia until the precipitate at first formed is redissolved; dilute with water to 1 pint, add the remaining portion of the bismuth solution with constant stirring, collect the precipitate on a calico filter, and wash with water until the washings are free from acid. Transfer the precipitate to a suitable vessel and add solution of ammonia gradually and with constant stirring until the precipitate is just dissolved. Dilute with water to 1 pint (imperial).

A competent practical pharmacist has at my request tried this formula, and he remarks, "It is an absolute contrast, in its simplicity, to the B. P. method;" but he fears that there is a great loss of bismuth in washing. This I had previously determined to be under 3 per cent., having obtained 97 per cent. of the theoretical yield of citrate. Hence, in the formula I give a slight excess of bismuth over what is required for 800 grains of citrate, and as the B. P. citrate may contain 2 per cent. of water, the loss in the washings is compensated by these provisions. Citric acid is also in excess. With the theoretical quantity the bismuth is apt to crystallize out before ammonia can be added. This is not by any means a fatal objection; therefore on the large scale it will be possible to modify the proportions which are given. Thus for citrate of bismuth the quantities might be—bismuth subnitrate, 13 parts; nitric acid, 14 fluid parts; citric acid, 10 parts.

It is obvious that the 1867 process may be modified according to the principle herein involved, and this may perhaps be the gentlest way for the Pharmacopœia authorities to recant.

Note.—Since the foregoing was written I have observed that Mr. Proctor, in his "Lectures on Pharmacy," recommends this process. I wonder why it has slipped recognition by the authorities?—*Phar. Jour. and Trans.*, Jan. 16, 1886, p. 602.

CHEMICAL AND MICROSCOPICAL STUDIES ON THE ACTION OF SALICYLIC ACID ON FERMENTS.[1]

By Dr. A. B. Griffiths, F.R.S.E., F.C.S. (London and Paris).

(Lecturer on Chemistry, Technical School, Manchester; Examiner in Chemistry, Blairlodge School, Polmont, N. B., etc.)

My attention has been occupied with a chemical and microscopical study on the action of various compounds on the lower forms of plant life. I have already presented to the Chemical Society of London a paper on the action of a solution of ferrous sulphate on certain parasitic diseases which attack our crops. I wish here to detail some studies on the action of salicylic acid on certain ferments (organized and unorganized). A solution of salicylic acid was prepared containing 0·2 gm. of the acid in 1000 c.c. of water. A drop of yeast was placed on a slide under the microscope, and then a few drops of the above salicylic acid solution was run in between the slide and coverslip, when I found it had no action on the true alcoholic ferment; for I was unable to stain the protoplasm of the cells with a dilute solution of eosin, showing that the protoplasm was not dead. But when I operated in a like manner on certain other organized ferments,—viz., on Mycoderma aceti, Bacterium lactis, and the Butyric bacillus—it was very different. On running in the same salicylic acid solution upon slides containing these various ferments they were quickly destroyed. What was observed under the highest powers of the microscope was that the salicylic acid acts chemically upon the cellulose or the *form* of cellulose making the external walls of these lowly organisms. It was evident that the acid dissolved the cellulose wall, and in some cases I could see that the cellulose wall had been perforated by the acid solution.

Beyond these facts, I have found that the above-named aqueous solution of salicylic acid also prevents the chemical action of hydration by means of the soluble zymases. If yeast is added to a solution of cane-sugar, and to this solution the salicylic acid solution is added, no decomposition, according to the following equation, takes place:

$$C_{12}H_{22}O_{11}+H_2O=C_6H_{12}O_6+C_6H_{12}O_6.$$

That is, the salicylic acid has acted upon the soluble zymase which is secreted by the Torula cerevisiæ. Hence no fermentation takes place. I allowed the above to stand for two or three days at a temperature

[1] A Paper read before the Royal Society of Edinburgh, January 4, 1886.

most suitable to engender alcoholic fermentation (about 80° F.), and then tested for glucose sugars by means of Fehling's solution without any result. I also tried the action of the salicylic acid solution upon a solution of starch which had previously been "inoculated" with a small quantity of saliva. After standing several days I could not find the smallest trace of glucose sugar. From this, salicylic acid acts upon the soluble ferment (ptyalin) contained in saliva, preventing the hydrating action upon the amyloses.

Then, again, I have found that the above solution of salicylic acid acts chemically upon the cellulose walls of *dead* torulæ, destroying them in a similar manner to the organized ferments already described at the commencement of this paper, but it (the acid) has *no* action on the *living* torula. This shows that a chemical change must have taken place in the molecular structure of the cellulose wall of the cell after death of the organism.

It is a well-known fact that in every brewery the yeast becomes deteriorated at certain times, and hence the beer brewed by such yeast is not so good as formerly. This is due to "disease ferments" in the yeast (the organisms I have alluded to in the early part of this paper). The common remedy is for the brewer to change his yeast. But I have found that this is not essential if the brewer waters the "diseased yeast" with the solution of salicylic acid; the "disease ferments" are all destroyed; the yeast is not acted upon by this solution. Yet at the same time the yeast so treated is not so active in its decomposition of a glucose solution into alcohol. This yeast can be revivified by an aqueous solution containing 0·25 gm. of potassium nitrate and 0·2 gm. of sodium phosphate in 2000 c.c. of water. In fact, the torula appears to decompose a much larger quantity of sugar (in wort) into alcohol in a given time after the above salts have been added to 2 liters of wort than when the wort is not so treated. It appears that the torula lives its life-history to a certain extent by extracting the potash and phosphoric acid from these mineral substances, which come into the wort from the barley and hops. Mitscherlich long ago showed that the ash of yeast gave no less than 53 to 59 per cent. of phosphoric acid, and from 28 to 39 per cent. of potash. Hence it may be that a larger amount of alcohol would be produced in beers by the addition of small quantities of the above substances to the wort.

From the above investigation the following conclusions are to be drawn:

1. That a certain solution of salicylic acid has no action on the living torula, but dissolves it when dead, showing that some chemical change (post-mortem) has taken place in the cellulose of the cell-wall.

2. That the solution of salicylic acid destroys "disease ferments by acting upon the cell-wall, showing that their cellulose most probably differs from the cellulose of the Torula cerevisiæ.

3. That the solution of salicylic acid prevents the hydrating action of the various soluble zymases.

4. A solution of sodium phosphate and potassium nitrate revivifies exhausted yeast, and even increases the yield of alcohol in saccharine solutions.

5. Salicylic acid acts as an antiseptic agent of great value, because it acts directly on the disease ferments in beers, and not upon the true alcoholic ferment.

6. Salicylic acid is not a poison in quantities far exceeding the amount in the solution given in this paper. The acid is largely used in medicine in both France and Germany.

For those interested in the application of this acid in medicine I refer them to the following memoirs:

(*a.*) Wagner's, "Le traitement de la diphterie, des maladies de l'estomac et des intestins."—*Moniteur Scientifique*, 1875, p. 355; also *Journal für Praktische Chemie*, xi, pp. 57 and 211.

(*b.*) Dr. Germain See's, "L'acide salicylique et les salicylates dans le traitement de la goutte et des rhumatismes."—Rapport à l'Académie de Médecine de Paris, June and July, 1877.

(*c.*) Fontheim's, "De l'action de l'acide salicylique employé comme médicament."—*Moniteur Scientifique*, 1875, p. 853.—*Chem. News*, January 15, 1886, p. 29.

Estimation of Quinine in Mixtures of Quinine-Alkaloids. — By Y. Shimoyama(*Arch. Pharm.* [3], xxiii, 209–229). — The method described is founded on the relative solubilities of the oxalates of the quinine alkaloïds:—Quinine oxalate dissolves in 1446 parts of water at 18°; cinchonidine oxalate in 228 parts at 15°; quinidine oxalate in 151 parts at 15°, and cinchonine oxalate in 104 parts at 10°. The precipitation is effected by adding sodium oxalate to a dilute neutral solution of the alkaloïds, and correction must be made or the amount of quinine oxalate remaining in solution.—*Jour. Chem. Soc.*, 1885, p. 935.

EUCALYPTUS PRODUCTS.

The introduction of the oil of eucalyptus into the new British Pharmacopœia will doubtless serve to direct attention to the products of this important genus of trees. The classical monograph of the genus by Sir F. von Mueller, of which ten decades are now before the public, contains a large amount of interesting and valuable information concerning both the oils of eucalyptus and the "kino" or inspissated juice yielded by many of the species. This information is, however, scattered throughout the body of the work, and the absence of a general index renders it by no means an easy task to piece it together. It may, therefore, save some time and trouble if a brief summary of the more interesting facts concerning these pharmaceutical products are presented in a connected form in these pages.

Eucalyptus Oil.—In a genus, of which the members so closely resemble one another that it is no easy matter to identify any given species, it might be imagined that the products would not vary to any great extent. This, however, is not the case, for not only do the volatile oils differ in specific gravity, but in flavor, and in the yield afforded by different species. The oil of *E. piperita* and *E. hæmastoma* have a peppermint odor, that of *E. citriodora* a citron odor, that of *E. Staigeriana* exactly resembles oil of verbena.

The percentage of oil in the different species will be readily seen from the following table, as given by Mr. Bosisto and Mr. Nitschke, as obtained from 1000 lbs. of about equal proportions of fresh leaves and twigs:

	Bosisto. Ounces.	Nitschke. Ounces.
E. amygdalina	500	
E. oleosa	200	62½
E. leucoxylon	160	
E. goniocalyx	150	
E. incrassata (*dumosa*)		140
E. globulus	120	
E. odorata		112
E. obliqua	80	
E. uncinata		69
E. gracilis		54½
E. rostrata	15	
E. melliodora	7	
E. viminalis	7	

The difference in yield of *E. oleosa* obtained by Mr. Nitschke probably depends upon the fact that the quantity obtainable varies ac-

cording to the time of year at which the leaves are distilled. *E. oleosa* gives at one time only 2 pints, and at others as much as 1 gallon of volatile oil per ton of leaves. In summer, when the soil is hard and dry, it yields but little oil; but in winter, when the moistened earth permits of more vigorous vegetation and development, the percentage of oil is much larger. The contrary is the case with *E. amygdalina*, which grows in upland districts, and which consequently has its vegetation checked by the greater cold in winter, and therefore yields oil most abundantly in the summer. The eucalyptus oil of commerce, as pointed out by Mr. MacEwan and others, has hitherto consisted chiefly of the oils of *E. amygdalina* and *E. dumosa*. The former lends itself well to the dilution of the more valuable essential oils, such as neroli, rose, etc., for use in perfuming soaps, etc. The latter finds its principal use in the manufacture of varnishes, a comparatively small proportion being used in medicine. This will be readily understood from the fact that in Mr. Bosisto's manufactory alone at least six tons of leaves are operated on daily, and the annual production is not less than 12,000 lbs. of the oil.

The solvent powers of eucalyptus oil on resins, etc., have been given in the following order: mastic, sandarac, elemi, xanthorrhea, resin, benzoin, copal, amber, anime, shellac, caoutchouc, and guttapercha.

The oil added to methylated spirit, in the proportion 10 ounces of the former to 1 gallon of the latter, is used to dissolve kauri resin, which will dissolve in this mixture without the aid of heat, to the extent of 2 lbs. out of every $2\frac{1}{2}$ lbs. used: the addition of a little colophony or Venice turpentine rendering the kauri resin completely soluble. It is also used to dissolve asphaltum for photograph varnish. In veterinary practice it is used in Australia as an embrocation for swellings, bruises or stiff joints. In domestic practice it is employed for rheumatism, etc.

The necessity for manufacturing the oil cheaply as a commercial product has naturally led to the choice of the two species mentioned, which as will be seen from the above table, yield a much larger quantity than *E. globulus*. The two other species which yield more oil than the latter, viz.: *E. leucoxylon* and *E. goniocalyx*, being probably more scattered in mode of growth, would be less easily procurable.

The oil which passes in commerce under the name of oil of *E. dumosa*[1] is likely to vary considerably in specific gravity and in charac-

[1] *E. dumosa* is considered to be a small form of *E incrassata.*

ter since it is obtained from the mallee scrub, a dense shrubby growth covering desert land and consisting of a mixture of *E. oleosa*, *E. incrassata*, *E. gracilis* and *E. uncinata* in different proportions. Mr. Bosisto calculates that in Victoria alone the mallee scrub is capable of furnishing 4,843,872 gallons of oil, and the *E. amygdalina* 280,861,000 gallons.

Other species yielding abundance of oil, such as the *E. salubris* of W. Australia, will probably furnish volatile oil to commerce, when manufactories are established in the districts where they are abundant. The trees mentioned by Sir F. von Mueller as oil-yielding species are *E. salmonophloia* and *E. Raveretiana*, W. Australia; *E. acmenoides*, *E. microcorys* and *S. eugenioides* in the Southern provinces. The volatile oil of *E. citriodora* will probably become an article of export as soon as it can be manufactured on a commercial scale, so as to compete in perfumery with oils of similar odor. This tree is regarded as a variety of *E. maculata*, bearing the same relation to it that *Thymus citriodora* does to *Thymus serpyllum*. The remark is made concerning it, in 'Eucalyptographia,' that the perfume seems only developed within the subtropical regions of the range of this species, but that it is nevertheless hereditary, *i.e.*, when cultivated outside those regions.

Under the head of *E. crebra*, another species of eucalyptus, discovered by Mr. Sellheim, is alluded to as having lemon-scented foliage. This has since been described by Mr. T. M. Bailey, in the excellent synoposis of the 'Queensland Flora,' as a new species, under the name of "*E. Staigeriana*, F. von Mueller, ined." This plant, according to Mr. Staiger, yields a large quantity of volatile oil, $2\frac{3}{4}$ per cent., which so exactly resembles oil of verbena in odor, that it might easily pass for it. Its specific gravity is 0·901. The odor of the oils of *E. piperita* and *E. hæmastoma* bears some resemblance to peppermint.—*Phar. Jour. and Trans.*, January 9th, 1886, p. 581. (See also Am. Jour. Pharm., 1876, pp. 371–375.)

Menthol in Urticaria and Pruritus.—Among the myriad of remedies for these troublesome affections we have no other which affords such complete and instantaneous relief as a solution of menthol. We have used this remedy for urticaria in three cases. Not only is the itching relieved for the time, but a cure seems to be affected. In pruritus ani, and in eczema, moistening the parts with menthol solution causes an immediate cessation of the pain. The solution should contain from 2 to 10 grains of menthol to the ounce of water.—*Buffalo Med. and Surg. Jour.*, March, 1886, p. 382.

COLORED REACTIONS OF PHENOLS WITH CARBOHYDRATES.

By Anton Ihl.

These reactions are produced by adding the pulverized carbohydrates to an alcoholic solution of the phenol.

a-Naphthol gives with cane-sugar at a gentle heat a splendid reddish violet color, which disappears on the addition of water; with milk-sugar a fine violet and with starch a dark red violet.

β-Naphthol gives with cane-sugar a yellow, which on prolonged boiling turns a dark greenish yellow with a greenish fluorescence; with milk-sugar, a pure yellow without fluorescence; with glucose, a yellowish green color with a strong green fluorescence; with dextrin, a yellowish; with arabin, a light yellow; and with starch, a faint yellow.

Resorcin gives with cane-sugar an intense fiery red, which retains its color on dilution with water; with milk-sugar, glucose, dextrin, arabin, and starch, yellowish red.

Pyrogallic acid gives reactions very similar to those of resorcin.

Phloroglucin gives with cane-sugar, on gentle heating, an intense yellowish red color, which became a fine light yellow on dilution with water; with milk-sugar a reddish brown; with glucose, a yellowish red; with dextrin, a slight dirty yellow; with arabin, on prolonged heating, an intense cochineal-red pigment, which is permanent on the addition of water.

The phenols are also well adapted for the detection of woody matters. They are used in an alcoholic solution, mixed with hydrochloric or sulphuric acid, and applied either cold or hot to the paper or wood in question.

Solution of orcin mixed with hydrochloric acid gives a splendid dark-red on wood; upon paper containing wood-stuff it gives a dark red-violet spot. Pure cellulose-paper undergoes no change.

Resorcin with alcohol and hydrochloric acid colors wood-stuff paper a violet-blue in a short time. Pure cellulose-paper remains unaffected. Resorcin with alcohol and sulphuric acid (one vol. alcohol, one-third vol. sulphuric acid), when warm, colors wood-paper or wood a dark violet-blue. Pure cellulose-paper is colored an onion-red.

a-Naphthol in alcohol and hydrochloric acid colors wood-stuff paper and wood greenish.

a-Naphthol, in equal volumes of alcohol and sulphuric acid, colors wood-stuff paper a dark green, whilst pure cellulose-paper takes a red-violet.

Pyrogallic acid in alcohol and hydrochloric acid colors wood-stuff paper and wood a bluish green.

Carbolic acid in alcohol and muriatic acid colors wood and paper containing wood a yellowish green.—*Chem. News*, 1886, p. 16; *Zeit. f. Anal. Chemie; Chemiker Zeitung.*

ACETOPHENONE, OR HYPNONE, A NEW HYPNOTIC AGENT.

By S. Limousin.

(Paper read before the Paris Société de Pharmacie. From the *Archives de Pharmacie*, vol. i., p. 1.)

Dr. Dujardin-Beaumetz has recently submitted to the Académie de Médecine and the Société de Thérapeutique the results of his clinical experiments upon the hypnotic properties that he has discovered in acetophenone, methylphenylacetone, or methylbenzoyl. He proposes to confer on this new remedy the name "hypnone," as being more easily remembered, and at the same time recalling its hypnotic properties.

The compound belongs to the aromatic series, and has for its formula $C_6H_5.CO.CH_3$. It has been obtained by Friedel by causing chloride of benzoyl to react upon zinc methyl, or by distilling a mixture of benzoate and acetate of calcium.

Acetophenone is a colorless, mobile, very refrangent liquid, boiling at 198° C. It is volatile, and its odor is tenacious and very persistent, recalling at the same time oil of bitter almonds and cherry laurel water. It is not inflammable, but it intensifies the combustion of substances impregnated with it. About 4° or 5° C. it becomes solid and forms a mass of large interlacing crystals. Its density is nearly that of water, but slightly superior, a cubic centimeter weighing 1·6 gm. It is not soluble in water or in glycerin.[1] The difference between the

[1] According to M. Vigier, hypnone is soluble in glycerin in the proportion of 1 part in 60 parts by weight.—*Ed. Archives.*

density of acetophenone and that of water is so slight that it remains in suspension in that liquid in the form of globules for some time before reaching the bottom of the vessel. It is neutral in reaction to litmus paper.

Acetophenone is very soluble in alcohol, ether, chloroform and benzine. I have ascertained also its great solubility in oils and particularly in oil of sweet almonds, which has suggested to me the idea of enclosing it in capsules after dissolving it in that menstruum.

With a compte-gouttes titrated according to the indications of Lebaigue acetophenone gives thirty-nine or forty drops to the cubic centimeter, which is nearly double the number of drops obtained with a cubic centimeter of water; each drop therefore weighs about $2\frac{1}{2}$ centigrams.

The liquid produces upon paper a rather persistent oily spot. Brought into contact in the cold with sulphuric acid, hydrochloric acid or perchloride of iron, it gives rise to no reaction or characteristic coloration. With nitric acid there is a production of a yellowish color. It dissolves bromine and iodine in large proportions with considerable development of heat, especially in the case of bromine.

Dr. Dujardin-Beaumetz was the first to demonstrate the hypnotic properties of acetophenone, which had escaped the observation of Popoff, who after Friedel was occupied with the study of this compound. The dose in which he has administered it to his patients has varied from 1 to 16 drops, and this dose always induces, according to him, four to six hours of refreshing sleep.[2] The quantity should be administered in a single dose to obtain a well-marked hypnotic effect, and it should be proportioned to the age and temperament of the patient. When injected subcutaneously, in the pure state, into guinea-pigs, in a dose of 50 centigrams to 1 gram, it brought on a kind of comatose somnolence, followed by the death of the animal five to six hours after injection.

Dr. Constantin Paul and Dr. Huchard have also experimented with this medicament in their hospital practice, and they have arrived at conclusions very similar to those of Dr. Dujardin-Beaumetz

In the first experiment Dr. Dujardin-Beaumetz administered the acetophenone diluted with olcohol, ether, or glycerin, and enclosed in capsules.

[2] It may be well to remark here that hypnone does not act when there is pain; it only procures sleep for persons free from suffering.—*Ed. Archives.*

M. Vigier has proposed to administer acetophenone under the form of a syrup, prepared according to the following formula:

Hypnone	1 drop.
Alcohol (60°)	1 gram.
Syrup of orange flowers	6 grams.

A tea-spoonful would correspond to one drop.

M. Vigier has also suggested the form of an elixir:

Hypnone	1 drop.
Alcohol (90°)	3 grams.
Syrup of peppermint	3 grams.

M. Petit has also proposed certain analogous formulæ, into which he introduces glycerin, but this, in my opinion, is useless, since acetophenone is as insoluble in glycerin as in pure water.

Lastly, Dr. Constantine Paul administered it in a mixture as follows:

Hypnone	4 drops.
Glycerin	2 grams.
Looch blanc (Codex)[3]	50 grams.

In this preparation the acetophenone remains mixed with the looch; this is probably due to the oil contained in the almonds, and not to the glycerin, which would with advantage be replaced by 2 gms. of oil of sweet almonds.

Considering the small doses in which this medicine should be administered, and the precision necessary in its measurement, I consider it preferable to employ gelatinous capsules, each containing two drops of hypnone and a few drops of oil of sweet almonds. In this way the ingestion is avoided of a certain quantity of strong alcohol or ether, which is relatively large considering that the dose of hypnone is only a few drops.

Whatever may be the future reserved for this medicament,[4] the experiments by Dr. Dujardin-Beaumetz will remain none the less interesting as showing the multiple resources presented to therapeutics in the new compounds created every day by modern organic chemistry. *Phar. Jour. and Trans.*, Jan. 9, 1886, p. 582.

[3] A preparation resembling mistura amygdalæ, but more concentrated, and containing bitter almonds and orange-flower water.

[4] One of the inconveniences of hypnone is that it communicates to the breath a disagreeable odor, due to its elimination by the respiratory organs.—*Ed. Archives.*

THE CULTIVATION OF COCA.

By Henry H. Rusby, M.D.

For more than two months the writer has been continuously engaged in the study of the coca-plant and its products in the districts of Bolivia which produce the best quality of leaves. The results, which are likely to greatly increase the recently-created interest in the plant, will be published shortly, when his studies shall have been concluded. At the present time I will only discuss a question concerning which speculation is rife, namely, the adaptability of the plant to culture in countries where it is now unknown.

For the details concerning cultivation here presented I am chiefly indebted to Mr. Oscar Lohse, one of the most intelligent cultivators in this country, and proprietor of the Finca of San Antonio, two leagues from the town of Caroica, Yungas.

The district of Caroica may be considered as fitly representing the remainder of Yungas, and Yungas as representing the principal coca districts of this republic. The conditions of soil and climate may be briefly stated. Proceeding eastward from La Paz, itself somewhat more than 10,000 feet[1] above the sea, for a distance of four or five leagues, we reach the summit of the pass over the easternmost cordillera of the Andes, this cordillera having an average elevation in this immediate district of perhaps 16,000 feet. This ridge, always more or less snow-covered, cuts off a large portion of the westward-bound clouds, which are thus either precipitated in the form of rain before reaching the summit, or, arriving there, are deposited in the form of snow, and then returned by means of rivulets to the valleys, chiefly of the eastern slope. It should be noted that in Northern Peru and Ecuador this cordillera is higher than here, so that the eastern slope in those regions is more profusely and regularly watered than here. From this pass, had we a direct road, we could travel in half a day, so steep is the descent, to the banks of the Caroica River, having an altitude of only 2,400 feet. When we have descended to 6,400 feet we should meet with our first coca plantations, and after passing the 2,000-foot level we should have left them principally or entirely behind. Within this 4,000 or 5,000 feet, then, lie the cocales of Bolivia. No description can convey a perfect idea of the steepness of this luxuriant slope. Travel, entirely by riding-animals, is extremely

[1] I have given altitudes and measurements approximately in English feet. By the Spanish measurements the altitudes are much greater.

difficult. There are only occasional places where we can readily leave the road, and here plantations are established. The hedge of coffee-plants at the roadside proves on examination to be the uppermost row of a plantation; and as we peer down among the shrubs we marvel that any one can preserve his footing while cultivating or collecting the coffee. The scenery is of course magnificent, and of a different type, I should think, from that of any other part of the world. The mountains are too young to have lost, to a great extent, their ragged outline, yet softness is imparted by the richness of the vegetation. We stand among the coca-plants and distinctly see another cocal nearly 4,000 feet below us.

As there is no better guide to the agricultural capacities of a country than its native plants, I will mention the characteristic classes. At the pass, with an altitude of about 13,000 feet, we have but little vegetation,—this low and mat-like, to escape the cold and the winds. Crossing, soon after, a spur having an elevation of 1,000 or 2,000 feet less, we meet with several Gentianaceæ, notably a Halenia, believed to be *H. Rothrockii*, Gray, of New Mexico. Here, also, are some shrubs in Acanthaceæ and Bignoniaceæ. At 9,000 feet we begin to find Orchids and Calceolarias, with some small trees in Melastomaceæ. At 8,000 feet we meet with our first tree-ferns; the timber-trees become quite large, and Begonias begin to make their appearance. From this point the vegetation begins to assume a really tropical aspect. We find many species of Calceolaria, Fuchsia, and Amaryllidaceæ, while the variety of orchids and ferns is quite bewildering. At 6,500 feet we see the first palms, and the forest-trees become buttressed giants, staggering under their loads of vines and climbing aroids and ferns, and their branches covered with Bromeliaceæ, orchids, and other parasites. Seventy parasites have been counted upon a single fallen tree.

The cultivated plants of the coca district are coffee, rice, cacao, sugar-cane, tobacco, maize, cotton (the arborescent species), sweet potatoes, yuccas, and the ordinary garden vegetables. The principal fruits are oranges, bananas, cocoanuts, lemons (sweet and sour), citrons, grapes, chirimoyas, alligator-pears, tumbas, pomegranates, grenadillas, figs, papayas, lukmas, melons, and pineapples, the last just introduced.

The soil in such a broken country is of course very diversified, ranging from a very light decomposed shale or sandstone to a heavy blue or chiefly yellow clay.

The rainy season begins in October, and continues until May or June. During this time the rains are copious and almost constant. During the succeeding two months there is scarcely a drop of rain, and during the next two there are only occasional showers.

Such are the conditions under which the coca grows in this section.

When we come now to consider the methods of cultivation here adopted, we must be cautious about accepting them as the best, merely because they are generally followed here. It is to be remembered that the Bolivian system of agriculture has not received the attention that it should have had, and that it is very probable that reforms might be introduced in present methods.

Nor is it proper to proceed concerning coca-culture without a few words concerning what is meant by the "best quality" of coca-leaves. To a manufacturing chemist the best quality would mean the quality that would yield the largest percentage of crystallizable cocaine, obtainable in the easiest manner, while the same coca might be considered for domestic consumption as representing one of the lower grades. It is highly probable that the amount of cocaine forms no element in the Indian's estimate of the quality of coca, no more than the percentage of nicotine establishes the quality of a particular grade of tobacco. Coca-leaves are classed in general by the Indians as "hajas dulces" (sweet leaves) and "hajas amargas" (bitter leaves). The former are made sweet by the abundance of alkaloids other than cocaine. While it is true that a greater abundance of those alkaloids is usually accompanied by a larger percentage of cocaine also, yet the variation in the amount of the latter is not so great as in the former; so that while in the sweet leaves the bitter taste of the cocaine is masked by the presence of the other alkaloids, in the bitter leaves its flavor is the predominant one. The presence, then, of these *sweet alkaloids*, as we may call them, translating the simple and expressive term of the Indians, determines the domestic value of the coca, and all that is known of the best methods of cultivation is based on the production of the highest percentage of these alkaloids. Experience may determine that for manufacturing purposes a very different line of principles of culture should be followed.

I have made a large number of assays tending towards elevations, soils, exposures, seasons, ages of plants, and of leaves, different varieties, wild and domestic, different parts of the plant, and various modes of drying and packing. The results will be embodied in a future mono-

graph, mere passing references being made to them for the present. I have about concluded that the percentage of the sweet alkaloids varies inversely as the amount and continuousness of moisture that the plant receives. Thus, the Peruvian, Ecuadorian, and Brazilian coca, which, as I have stated, is much more copiously and regularly watered than the Bolivian, is markedly inferior, so that Bolivia regularly exports about one-eighth of her crop to those countries. I am inclined to think that the greater breadth and thinness of the northern leaf may be partly due to the greater water-supply and the consequent greater degree of evaporation. Again, the Indian always seeks the coca grown at the higher elevations, where the humidity is much less and more irregular than in the districts along the rivers. We are thus obliged, for reasons to be elaborated in the future, to regard these alkaloids as preserving a sort of a balance of moisture, by which the plant stores up during the wet weather a concentrated supply of water, which may be very slowly yielded up during a time of need.

Having thus chosen a high altitude, the next thing is to select a soil. A rivalry exists between a yellow clay and a hill-side soil rich in vegetable matter. My assays have yielded the best results (as to total alkaloids) from soils of the latter class, and I am inclined to think that those who prefer the former soil do so because it yields a somewhat larger crop.

The ground for the nursery-bed is prepared during the latter part of the dry season by breaking it up very thoroughly to a depth of a foot or more. The fruits mature during the early part of the rainy season, December and January. They are red, and consist of a fleshy outer portion and a shell-like inner portion, which encloses the single seed. These people suppose that the germ cannot escape from the shell if planted in its natural condition, and they have continued for hundreds of years to deposit the seeds as soon as gathered in a shaded place, in layers an inch or more deep and covered with a thin layer of decaying leaves or similar substance. The heat generated by the decomposition of the fleshy pericarp serves to induce germination, and the embryo bursts from its bony covering. This growth unites them, in from eight to fourteen days, into a solid mass, which is broken up into small pieces and planted in furrows in the nursery. In this process very many of the sprouts are broken off and the plants destroyed. Mr. Lohse has adopted the plan of sowing the seeds broadcast as soon as gathered, and covering with a little earth, or, better, a

layer of banana-leaves or other decaying vegetable matter. Germination requires from eight to twelve days longer, but all the plants are saved. In either case a covering of brush or straw must be placed overy the nursery, at first only three or four inches above the surface, and elevated to six or seven inches as the plants grow. Usually this elevation is repeated once more.

All this taking place during the rainy season, the plants have reached a good size before the advent of the dry weather, and so do not call for any artificial water-supply. Advantage is taken of the ensuing dry season to clear the land and prepare the ground for the new cocal. On the manner in which this is done depends much of the future well-being of the plants. The ground should be thoroughly powdered to the depth of two, and, if possible, three feet, all roots and large stones being removed. On these steep slopes it is necessary to terrace, the terraces being supported by stone walls, the stones laid dry. The width of the terraces, according to the slope, varies from several feet, with a number of rows of plants, to much less than the height of the wall, only a single row of plants being admissible. It is here generally believed that shade tends to the production of the best quality of leaves; so the cocales are planted thickly with a small broad-topped leguminous tree related to the St. John's bread, but whose name I cannot at this moment recall. There is no doubt that this is a mistake. I have made repeated comparative assays of shade-grown and sun-grown leaves from adjoining plants, and invariably found the latter much richer in total alkaloids. I judge the custom to have arisen from two considerations. There is, as I have stated, a period of two or three months when the plants receive no rain, and then these trees afford a protection from the fierce heat. Secondly, shade conduces to the production of a large, smooth, beautiful leaf, of elegant color, and thus adds to the *appearance* of the product. The terraces being thus prepared, on the advent of the permanent rainy season the plants, now from eight to twelve inches high, are transplanted, being set from one-half to six inches apart, according to the ideas of the haciendero. From this time until the first leaves are picked the greatest care must be taken to keep the soil thoroughly stirred and free from weeds. The plants having been transferred in October or November of one year, the first picking is made in March or April of the second following year, one year and a half from the time of transplanting, or two and one-half from the seeds. In case

an insufficient space has been prepared, the remaining plants are often left until the following year, and then transplanted, the operation being much more dangerous to the life of the plants.

The chief danger of picking the leaves earlier than the period indicated above is not the strain upon the vitality of the young plant, as many of the leaves drop of themselves, but because it is almost impossible to avoid breaking off the very tender tips of the twigs, the result being fatal to many plants. Immediately after this first picking, fresh leaves develop with great rapidity, and in July or August of the same year the plant flowers for the first time. The lovely white flowers, if undisturbed, remain for from three to six days; but from the very first they are dislodged by the slightest jar, the corolla falling entire, although it is morphologically polypetalous. The fruit ripens in December and January.

During the first few years the percentage of alkaloid increases rapidly, reaching its maximum at or before the age of ten years. At the age of twenty it begins to diminish, but with extreme slowness, so that the plants are practically in their prime up to the age of thirty-five or forty. It is probable that the decline is then due rather to the exhaustion of the soil than of the vitality of the plant. Fertilization of the soil has never been resorted to. It is probable, as suggested by Mr. Lohse, that as much can be done for the coca in this way as has been done for other plants.

A coca harvest is called a *mita*, an Indian word meaning a division or drawing of lots, and there are from three to five in a year, according to the season. The time of picking is determined solely by the condition of the leaves. When they have become mature they turn yellow, if in the dry season, and brown, if in the rainy, and within eight days at the outside will fall to the ground and be lost. As soon as the mita is over, the ground is cleared from weeds, and, under an ignorant notion that further cleaning is injurious, is left undisturbed until after the next mita. But Mr. Lohse has tried the plan of keeping the ground clean, with the result, thus far, of receiving the next crop in little more than one-half the time required by his neighbors. No irrigation is resorted to during the dry season. Although it is possible that good might result, at least to the welfare of the plant and the size of the crop, I suspect that after a long time an abundant and steady supply of water would result in a decrease in the amount of alkaloids. Mr. Lohse has tried the experiment of

mulching at the end of the wet season with a few inches of banana-leaves or other refuse, with excellent effect upon the plants during the succeeding dry season.

This plant is subject to only two diseases of any importance. The first is taja, which I suppose to be the result of a fungus which attacks the undeveloped leaves and tender twigs. It is said by some to be caused by careless picking, in which the twigs are broken. By others it is said to result from the planting of seeds taken from young plants. The only remedy is to remove and burn the diseased portions. The second disease, if such it can be called, is the ravages of a caterpillar called "ulo," which makes its appearance in December, and destroys the crop so quickly that it admits of no remedy.

The method of picking and drying the coca has been so often and so well described of late that it is not necessary to dwell upon it. Coca-picking is a profession to which the children are trained from a tender age. The leaves are picked singly, both hands being employed with a rapid alternating motion, which strips a twig in an instant. Great care is taken to avoid breaking the twigs, and the young leaves are not picked. Little sacks are tied about the waist, or the women's aprons are pinned or sewn into the required form. They are then transferred to larger sacks, which must be filled and emptied with great promptness, or the leaves will become heated and turn black.

The price here paid for picking is a Bolivian dollar, equal to about seventy-one cents United States currency, for each thirty pounds, which, when dry, will weigh about twelve pounds.

The leaves are exposed to a hot sun upon a pavement of nicely-fitted flat stones, and stirred occasionally until dry. Under the most favorable conditions the drying is accomplished in about three hours. About the coca place are built the storage and packing-sheds. These are furnished with very broad doors, and men are in constant attendance to sweep the coca with brush-brooms through these broad portals at the slightest indication of rain. A very few drops of rain are sufficient to decolorize and ruin the sale of the coca, though it is my impression that such decolorization, if produced by but little rain, is no indication of loss of cocaine. During the first few days that the dry coca lies within the storage-sheds it undergoes a slight sweating process.

When I come now to speak of the best methods of packing the

coca for export, it is fair to say that nothing definite is known. Such coca as has reached Europe or the United States in good condition has done so purely by accident; for perhaps the very next lot, dried, packed and shipped as nearly as possible in the same manner, has arrived entirely ruined. I have tried many methods, and as often as I had thought that the secret was discovered, my hopes have resulted in disappointment.

As regards the exportation of the culture of coca, the experiment has been tried, I believe, but once. Several years since, Mr. F. L. Steinart, of La Paz, shipped a small quantity of seeds *via* London to Ceylon, and during the past season the first products were shipped to London and sold at a high price. Seeds for export should be exposed for several days to a hot sun, so as to rapidly dry the fleshy exterior, which thus forms a protection to the germ within.

It is my opinion that the coca-plant is adapted for culture in many countries where it is now unknown. Among the countries where it would be well to experiment with it are Guatemala, Mexico, the East and West Indies, India, Southern China, portions of Africa, and possibly of Italy. It is doubtful if it would grow in any portion of the United States. Requiring an average temperature of at least 70°, the only districts at all suited would be Florida and Southern Texas; and it is highly probable that proximity to the sea-coast at so low an altitude would prove fatal. Nor would irrigation prove adequate in those countries possessing a long dry season. The plants must not only have an abundant supply of water at the roots; they must be bathed in a humid atmosphere for the greater portion of the year. But from what I have read of some of the countries above named, I am confident that the plant would there find a congenial home. Jamaica offers especially hopeful conditions.—*Therapeutic Gazette*, 1886, pp. 14–18.

Amyl Nitrite as a Physiological Antidote in Cocaine Poisoning.—Schilling records a case of severe cocaine poisoning, in which, after the intragingival injection of two drops of a twenty per cent. solution of this drug, motion and sensation entirely disappeared. Complete amaurosis and deafness were present. The patient could swallow well, and called to her husband, who was absent, complaining of cold and darkness. Schilling, recognizing the condition as one due to contraction of the cerebral vessels, exhibited nitrite of amyl. The face of the patient immediately became suffused, and she cried, "Now it is light again." After three inhalations she was in condition to reply correctly to all questions, and soon after returned to her home.—*Med. News*, March 6, 1886.

THE INFLUENCE OF KAIRINE, THALLINE, HYDROCHINONE, RESORCIN, AND ANTIPYRINE ON THE HEART AND BLOODVESSELS.

By Dr. H. G. Beyer.

Chemists, for a number of years, have been industriously experimenting, hoping to find a way to produce quinine artificially. The result has been the discovery of a number of substances, some of them belonging to the phenol series of organic compounds, and possessing to an eminent degree the power of reducing hyperpyrexial temperatures. Of these, kairine, thalline, hydrochinone, resorcin, and antipyrine, have all been found to reduce abnormal temperatures to a greater or less degree, in almost all febrile disorders promptly, though perhaps not permanently. An experimental inquiry into the probable relations of these new antipyretics to the circulatory apparatus has been made by Dr. Beyer, and the results, which he gives in an elaborate article on the subject, justify the attempt to solve the problem.

The experiments have been arranged into two groups: I. Experiments on the work done by the heart when isolated from the central nervous system. II. Experiments on the bloodvessels: on the flow through the vessels of animals the brains and spinal cords of which had been destroyed; on the lingual vessels of curarized frogs. In addition to this, a short account of the influence of these drugs upon the corpuscular elements of the blood and the coagulation of blood is given.

Dr. Beyer's experiments show that kairine reduces temperature, both by diminishing heat production and by increasing heat radiation. The distinctive influence it exerts on the red blood-corpuscles, however, and the weakening effect upon the heart, render its employment objectionable and dangerous.

Thalline, like kairine, reduces temperature by diminishing heat production, and by increasing heat radiation; as an antipyretic it is less dangerous, but no less objectionable, than kairine, for while its effect upon the ventricle of the heart is less depressing than that of kairine, its influence upon the blood-corpuscles is sufficient to condemn it.

The action of hydrochinone is similar to that of kairine and thalline. Resorcin reduces the temperature by increasing heat radiation by the dilatation it produces in the capillaries and veins, especially the latter.

Antipyrine reduces temperature purely by increasing heat radiation, owing to its extensively dilating the veins and capillaries; but what stamps it as an excellent antipyretic is that, besides dilating the

veins, it also has a tonic influence on the heart and slightly increases arterial pressure, or, at any rate, does not cause a diminution of the same. It has, moreover, no injurious influence on the blood or the muscular tissues, and strengthens the auricles.

The objection to the employment of kairine and thalline as antipyretics arises from the fact that they cause heart paralysis, especially affecting the auricles, in doses only slightly larger than are sufficient to produce a lowering of the temperature. But this objection becomes an absolute danger when we take into account the destructive influence upon the blood-corpuscles and tissues generally.

Hydrochinone and resorcin, although not exerting the same weakening and directly paralyzing influence upon the ventricle of the heart which is peculiar to kairine and thalline, both paralyze the venous side of the heart, viz., the auricles, and greatly lower the tone of the walls of the veins. The extra amount of blood, therefore, which is driven into the veins through the increased action of the ventricle, is only with great difficulty returned to the ventricle, and here the danger is not so much from failure in the power of the ventricle as in the case of kairine and thalline, as from the danger of *bleeding the animal to death into its own veins.* The intense visceral and especially pulmonary congestion found post-mortem, by Dujardin-Beaumetz, and others, in animals killed by resorcin, seems to confirm this view of the matter.

Antipyrine, though largely dilating the veins, increases the power of contraction of both auricles and ventricle, and has no injurious influence upon the blood nor the muscular tissues, and therefore possesses, indeed, all the good qualities of a perfect antipyretic.—*Am. Jour. Med. Sciences*, April, 1886, p. 369–402.

Cocaine. Correction.—Dr. A. B. Lyons desires to correct a statement made in his paper on cocaine, with regard to the value of the equivalent of Mayer's reagent in estimating the alkaloid by titration. The figures given (*Amer. Jour. Phar.*, Oct., 1885, p. 473) are only one half the true values. Thus in a solution containing one part of alkaloid in 500, one c. c. of Mayer's reagent precipitates twenty milligrams instead of ten of the alkaloid. The error arose from the use of a solution—as recommended by Dragendorff—of just one half the strength of the ordinary Mayer's reagent. Any attempt, however, to employ this reagent in the practical evaluation of galenical preparations of coca is likely to lead only to confusion and disappointment.

THE REACTION OF ATROPINE WITH MERCUROUS SALTS.

By Alfred W. Gerrard, F.C.S.

The *Pharmaceutical Journal* of January 16 (see Amer. Jour. Pharm., 1886, p. 129), contains a communication by Professor Flückiger which confirms a previous observation of mine that atropine and other mydriatic alkaloids throw out mercuric oxide from mercuric chloride. In the same communication Professor Flückiger also states "mercurous chloride, however, is not blackened by atropine;" this being contrary to fact I have placed on record the experiments on which my assertion is based.

When pure atropine in powder is shaken with mercurous chloride and cold water no reaction is apparent, but as soon as the mixture is warmed the white mercurous salt becomes almost black. The development of the reaction is physically aided by adding to the mixture one-fourth its volume of alcohol, which by its solvent action on the atropine promotes contact with the mercurous salt. I find that when atropine is added to a soluble mercurous salt, as the nitrate or acetate, the black precipitate is immediately formed in the cold.

Being uncertain as to the exact nature of the decompositions, I made the following experiments to determine this point:—

First Experiment.—0·471 gm. of mercurous chloride, and 1·156 gms. of atropine were weighed, the atropine being, from a calculation, double the molecular quantity required to convert the mercurous chloride into its oxide. The atropine was dissolved in a mixture of 5 volumes water and 3 volumes alcohol, the mercurous salt was added and the mixture warmed and shaken for some minutes; the black powder which formed was transferred to a weighed filter, then well washed with alcohol and water, and dried over sulphuric acid; the precipitate weighed 0·452 gm. This was evidence that the powder was not mercurous oxide alone, or its weight would have approximated to 0·416 gm. Suspecting the powder to contain either atropine, or unchanged mercurous chloride, it was divided into two parts and examined as follows:—The first part was treated with nitric acid, which dissolved the black powder, but left a white insoluble residue containing chlorine and mercury. The second portion of the powder, to test it for atropine, was shaken with potassium hydrate and ether; the ether when decanted and eva-

porated left but a shadowy film. These tests, which I have since confirmed, show that when atropine is digested for a limited time with mercurous chloride, it yields a mixture of mercurous oxide and chloride, and that no atropine enters into the composition of the precipitate.

My attention was next given to the examination of the filtrate and washings of the first part of the preceding operations. They were strongly alkaline, and, when heated to remove alcohol, deposited on cooling some fine crystals, which proved to be pure atropine. The liquor from which the crystals had been removed was found to contain chlorides and combined atropine, mercury was absent. This was evidence that no double compound of the mercurous chloride and atropine had been formed, as is the case with mercuric chloride and atropine.

Second Experiment.—It was made to ascertain the reaction between atropine and a soluble mercurous salt. 0·400 gm. of mercury was dissolved in cold nitric acid and treated with atropine in excess; the abundant black precipitate which formed was allowed to subside. The decanted solution on examination was found to consist of free atropine and nitrate of atropine, mercury was absent. The black precipitate, carefully washed and dried, weighed 0·406 gm. and on analysis proved to be mercurous oxide with a small portion of free mercury; the low yield—0·406 instead of 0·416 gm. which it should have approximated to—is to be accounted for by the ease with which mercurous oxide parts with its oxygen on drying.

The second experiment is quite in harmony with the first, differing only in the completeness of the reaction, and shows the change to be one of ordinary double decomposition. I find that the reaction with calomel is proportionate to the length of time it is subjected to warm digestion with the atropine.

It was particularly noticed in the second experiment that a considerable quantity of atropine had to be added before the mercurous salt gave a precipitate. Seeking the cause of this I found it due to the fact that mercurous salts diluted with water yield a mixture of acid and basic salt, and the acid salt must be neutralized by a portion of atropine before reduction can take place. This property of mercurous salts lessens, to some extent, the delicacy of the reaction, and decreases its value as a test; but I find large dilution is in a great measure a remedy for the acidity.

To determine to what extent the reaction can be used as a test for atropine, and the best conditions for applying it, I made some experiments, of which the following gave the best result:—Dissolve 0·208 gm. of fresh precipitated mercurous oxide very carefully in dilute nitric acid, avoiding excess; it is better to leave a trace of oxide undissolved; now dilute the product to 78 c.c. with water, which gives a solution containing nearly one-third per cent. mercurous nitrate. Prepare a 1 per cent. solution of atropine, by dissolving the pure alkaloid in a mixture of 20 volumes alcohol and 80 volumes water. On mixing drops of each of the solutions on a watch glass, resting on a sheet of white paper, a black precipitate is at once produced, consequently indicating less than 0·001 gm. of atropine. If the test be done in a test tube with 1 c.c. of each solution, the blackening is rendered more apparent, owing to the greater volume of precipitate. That the alcohol has no influence on the reduction was proved by a negativ-experiment, also by the fact that a hot simple aqueous solution of atropine, made by boiling, reacts powerfully with mercurous nitrate.

Experiments made with mercurous acetate did not give such good results as the nitrate.—*Phar. Jour. and Trans.*, March 6, 1886, p. 762.

THE ALCOHOLIC EXTRACT OF THE ROOT OF ATROPA BELLADONNA.[1]

By Professor Wyndham Dunstan and Francis Ransom.

Since the completion of the last part of this inquiry[2] an alcoholic extract of the root of *Atropa Belladonna* has been made official in the new British Pharmacopœia. In the present paper the results of chemical experiments are described, which were instituted for the purpose of (i.) devising a satisfactory method of estimating the total alkaloid, and (ii.) determining whether the extract as met with in commerce varies

[1] Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, March 10, 1886.

[2] The papers already published are "The Assay of Atropa Belladonna. Part I. The Estimation of the Alkaloids in the Root of Atropa Belladonna." Part II. "The Estimation of the Alkaloids in the Leaves of Atropa Belladonna." "Chemical Report on the Pharmaceutical Preparations of Atropa Belladonna. Part I. The Alcoholic Extract of the Leaves of Atropa Belladonna."—See *Amer. Jour. Pharm.*, 1884, p. 279, and 1885, pp. 532 and 534.

to any considerable extent in alkaloidal strength. In a previous paper read before this Society (see Am. Jour. Phar., 1884, p. 279), we have described a method by which the quantity of alkaloid in the root of *Atropa Belladonna* may be accurately ascertained. The uniformity in the alkaloidal strength of the extract prepared from the root is, however, dependent not only upon the corresponding uniformity in the root, but also upon the solvent which is employed, and the manner of its employment.

The Estimation of the Total Alkaloid.—It was in the first place necessary to devise an accurate process for the estimation of the total alkaloid, and one which should, if possible, be free from complexity. This we have succeeded in doing by means of a modification of the process which was employed for the same object with the root itself. The method now proposed consists in dissolving about 2 grams of the extract with a gentle heat in water acidulated with hydrochloric acid. The liquid is filtered, and the residue washed with dilute hydrochloric acid until the washings yield no precipitate with a solution of iodine in potassium iodide. The clear liquid is then rendered alkaline with ammonia, and extracted with chloroform until nothing further is removed. Two separate extractions with half its volume of chloroform are usually sufficient for this purpose. The chloroform is next twice agitated with its own volume of water acidulated with hydrochloric acid. It now only remains to render this liquid alkaline with ammonia, and to twice extract it with half its volume of chloroform. The chloroform, when spontaneously evaporated, yields a residue of the crystalline alkaloids (atropine and hyoscyamine), or when evaporated at 100° C. a residue of fused alkaloids which should be dried until it has a constant weight. In these experiments no advantage is gained by evaporating the liquid and drying the residue at a lower temperature, for we have found that a residue so prepared undergoes no appreciable decomposition at the higher temperature of 100° C. That the residue obtained in this way is entirely alkaloidal in its nature was proved by the method of precipitation as periodide, which has been described in a previous paper. The following results may be cited :—.

	Weight of alkaloidal residue taken.	Weight of alkaloid recovered.
a	0·057	0·054
b	0·018	0·0145
y	0·072	0·0695

Examination of Commercial Specimens.—The amount of alkaloid in various commercial extracts was now determined, with the following results.—

Analyses of the Alcoholic Extracts of the Root of Atropa Belladonna met with in Commerce.

Number of extract.	Per cent. of alkaloid in normal extract.	Per cent. of alkaloid in dry extract.	Per cent. of water.
I.	1·75	2·08	16·0
II.	1·85	2·36	21·4
III.	3·0	3·60	16·8
IV.	4·45	5·67	21·6
V.	3·20	4·0	20·0
VI.	3·65	4·4	16·8
VII.	3·0	3·55	16·0
VIII.	3·6	4·28	16·0
IX.	1·65	2·04	17·7

The quantity of alkaloid has been calculated in the normal extract that is in the preparation as prescribed and dispensed, and therefore indicates the difference in strength which is experienced in actual practice. The quantity of alkaloid has also been calculated in the dry extract to admit of an accurate comparison of the variations in alkaloidal content which arise from causes other than differences in consistence.

The great variations which these analyses disclose can scarcely be entirely due to a corresponding variation in the alkaloidal content of the root. They are, no doubt, in great part due to differences in the method of preparing the extract, and especially to the relative quantities of alcohol and water which are employed. The method of the British Pharmacopœia consists in percolating with alcohol and subsequently with water to displace the spirit. The water dissolves from the root much albuminoid and mucilaginous matter left undissolved by the spirit and the extract will be greater in bulk, though weaker in alkaloid, than when alcohol alone is used and removed from the marc with a filter-press.

An extract was prepared from a specimen of root (containing about ·3 per cent. of total alkaloid) with alcohol alone. It contained 2·8 per cent. of total alkaloid. When an extract was prepared as directed by the British Pharmacopœia, only 1·7 per cent. of alkaloid was found in the product. Hence it is clear that in order to prepare extracts that

shall be uniform in alkaloidal strength, it is necessary to determine by experiment the kind and quantity of the solvent which should be used. This we hope to be able to do.

This extract contains in addition to the alkaloids atropine and hyoscyamine, chrysatropic acid, $C_{12}H_{10}O_5$, probably a naphthalene derivative which causes alkaline solutions of the extract to have a distinct fluorescence (Kunz, *Arch. Pharm.*, [3]. xxiii., 722). It also contains much dextrose, and we have recently obtained evidence of the presence of another alkaloid, which is being further investigated. —*Phar. Jour. and Trans.*, March 13, 1886, p. 777.

ERGOT OF DISS.

By E. M. Holmes, F. L. S.,

Curator of the Museum of the Pharmaceutical Society.

During the last month a fine specimen of this ergot attached to its host plant, was presented by Professor Léon Soubeiran, of Montpellier. At the present time, when ergot has doubled in price, this variety seems to demand a fuller notice than was given of it some years ago in the Report on the Materia Medica of the Paris Exhibition (*Phar. Jour.* [3], ix, p. 84).

The ergot of diss derives its name from the reed on which it grows, *Ampelodesmos tenax*, Link, which is called diss by the Arabs of Algeria. The plant is very common on all the litoral region of Algeria, and is found also in Corsica, Sicily and Italy.

It is known to botanists by the following synonyms: *Arundo ampelodesmos*, Cyr. Neap.; *Arundo festucoides*, Desf.; *Arundo mauritanica*, Poir.; *Arundo tenax*, Wahl; *Donax tenax*, Pal. de Beau. It is figured in Desf. "Atlas," I, t. xxiv.; Cyr. Neap., t. xii.

The plant grows from 6 to 10 feet high, and has a spreading or turfy habit of growth. The panicles are elongated, somewhat interrupted and pendulous, or curved towards the summit. The leaves are very tough, straight, elongated and channelled, and acute at the apex, the upper surface and the margin being rough to the touch. The rhizome has recently been introduced into use in homœopathic medicine. The ergot, which is found on this plant, was first detected in 1842 by M. Durieu de Maisonneuve, a member of the Scientific Commission of Algeria. It differs from ergot of rye in being barely half its diameter, but twice or thrice its length. It varies, however,

considerably in size, from 3 to 9 centimeters in length, and from 2 to 2½ millimeters in diameter, this ergot being probably larger in proportion to the size of the seed on which it grows than any other, except, perhaps, that of the Timothy grass (*Phleum pratense*, L.).

Shortly after the discovery, by Tulasne, of the mode in which the sclerotium or ergot develops the fructification of the fungus known as *Claviceps purpurea*, M. Durieu de Maisonneuve, following the process adopted by Tulasne, cultivated the sclerotium of the ergot of diss and obtained the same fructification that is produced by the ergot of rye. Notwithstanding the difference in size and shape of these and of the ergots of several other grasses, it would appear that all that have yet been cultivated must be referred to the same fungus.[1] If this be true, it becomes an important fact in its relation to agriculture, since unless ergot in grasses be kept down or destroyed, the crops of cereals must suffer. That the different forms of ergot possess the same properties appears evident from the injury to cattle from ergotized grasses that has been reported of late years.

The ergot of diss, when small, is slightly curved, but when long (6–9 centimeters), it takes a spiral turn from right to left, the longitudinal furrows being present on the inner face; being of less diameter than ergot of rye it is dryer and more brittle. It is collected in June, July and August during dry weather. If collected later the sun appears to have an oxidizing effect on the ergot. In September the ergot is found to contain less oil. In a dry place it keeps well, being less hygroscopic than ergot of rye. M. Lallemand, of Algiers, who introduced this ergot into use in medicine in 1860, says that he has kept it for three years without any visible alteration, and has never noticed on it the acarus which attacks the ordinary ergot of commerce. He remarks, however, that the acarus does not attack ergot of rye so long as it is dry, but appears as soon as the drug becomes damp.

M. Lallemand (to whose instructive paper on the subject, published in 1862, I am indebted for most of the information here given), has made a chemical examination of the ergot of diss. He finds that the oily fluid exhausted by chloroform, ether or bisulphide of carbon,

[1] The ergots of the following grasses have been referred to *Claviceps purpurea*, Tulasne:—*Psamma arenaria, Lolium perenne* and *L. temulentum*, L., *Triticum sativum* and *T. repens, Avena elatior, Brachypodium sylvaticum, Dactylis glomerata, Alopecurus agrestis, Glyceria aquatica*, and *G. fluitans, Anthoxanthum odoratum.*

separates into two layers. The upper is not saponifiable, and if distilled it is partly decomposed. The lower layer is of a thick consistence and holds in suspension opaline flakes, apparently of resinous matter. It is inflammable and becomes brown when heated. Administered to a dog both oils produced poisonous symptoms, causing vomiting, slowness and weakness of the pulse, extreme thirst and feebleness of the hind legs. M. Lallemand agrees, therefore, with those who consider the oil to be poisonous, and who believe that it should be removed from ergot.

By treating with boiling alcohol the residue left after exhaustion by ether, reducing the alcoholic liquid to a small volume and adding to it distilled water or a few drops of nitric acid, the ergotin of Wiggers is precipitated. This appears to be of the nature of an acid resin, since it is insoluble in hot water and ether, soluble in cold, but still more readily in boiling alcohol; also in caustic, but not in carbonated alkalies. It also dissolves in sulphuric and acetic acid, coloring these liquids.

M. Lallemand finds that the ergot of diss contains 2·30 per cent. of this ergotin and 30·60 per cent. of the oils; but that samples of ergot gathered in the same week in different localities yield different percentages of these constituents.

Ergotin prepared as above descibed, washed with distilled water and dried, presents the appearance of a reddish-brown powder.

The extract called ergotin by Bonjean can be obtained from the ergot of diss as follows: The powdered drug is moistened with distilled water and allowed to swell for three or four hours. It is then packed lightly in a percolator and distilled water allowed to pass through it; but unless the powder has swollen to its full extent before packing, filtration becomes impossible.

The percolate is evaporated as soon as practicable on a water-bath or at a low temperature, and when reduced to the original weight of the ergot, it is filtered to separate the albuminous matters that are precipitated by the heat employed. The filter is washed with distilled water and the washings added to the filtrate, which is again evaporated to a clear syrup. To this is added twice its weight of 86° alcohol, by which gummy matters are precipitated. The decanted liquor is again reduced to a syrupy consistence. Thus treated the ergot of diss yields a little over one-sixth of its weight of fluid extract.

This extract, or ergotin of Bonjean, is hygrometric, of a clearer brown-red than that made from ergot of rye. At first the taste is sweet, then slightly acid. It is very soluble in water, and the solution reddens litmus slightly.

The above preparations of ergot of diss have been employed by Drs. Fourmeaux, Lelièvre and Charbonnier. M. Lallemand records two cases, one in which the powdered ergot was given as a parturient in two doses of 0.50 gm. with an interval of twenty minutes with excellent results, and the other in which the fluid extract was given in a severe case of hæmoptysis, and at once arrested the bleeding, which did not recur again. The ergot of diss is alleged to be twice as strong as the ergot of rye, only half the dose being necessary to produce the same effect. It can be obtained at a much lower price, as it is abundant and easily collected. Being less hygroscopic and not readily attacked by acari, and apparently possessing properties identical with those of ergot of rye, it seems worthy of the attention of the medical profession in this country.—*Phar. Jour. and Trans.*, Feb. 13, 1886, p. 684.

MINUTES OF THE COLLEGE.

The annual meeting of the Philadelphia College of Pharmacy was held March 29th, 1886; Chas. Bullock, presiding. Twenty-three members in attendance.

The minute of the last stated meeting was read and adopted. The minutes of the Board of Trustees for January, February and March, were read, and, on motion, approved.

The report of the Librarian was read and accepted. Professor Maisch suggested some modification of the report, and, on motion of Professor Sadtler, it was referred back for that purpose.

The report of the Curator was presented and accepted. The statement is as follows:

"That the cabinet collection is in good condition. Numerous additions of rare specimens have been made during the year. The collection of pharmaceutical specimens has been increased, and the Curator takes this opportunity of again calling attention to this subject by requesting the members to contribute specimens of such pharmaceutical preparations as may be made by new or improved formulæ. A collection of this kind would, in time, become very interesting by showing the permanency, or changes, which would take place in such preparations. New apparatus in the form of "Carré" ice machines have also been received, but, owing to imperfect packing, some damage has been done, which must be repaired before the apparatus will be fit for exhibition. As heretofore ample opportunity was afforded students of inspecting the collections during the lecture courses. Respectfully submitted,

CHAS. FRED. ZELLER, *Curator.*"

The report of the Editor, Professor Maisch, was offered, accepted, and, as usual, referred to the Committee on Publication. The language of the report is as follows:

"The Editor respectfully reports that during the past year ending with the month of March, the American Journal of Pharmacy published *sixty-four* original papers, an increase of *one* over the previous year. This sum does not include the miscellaneous "Gleanings" prepared monthly by Mr. J. Rob. Moechel and by Mr. Geo. H. Ochse, Ph. G., nor the Gleanings in Materia Medica, various items, Editorials, Reviews, and other notices prepared by the Editor. The publication last year of the New Mexican Pharmacopœia offered an excellent opportunity of studying the pharmacy as practised in a neighboring country; accordingly considerable space was devoted to the formulary of that pharmacopœia, and more particularly to its materia medica, all that seemed to be of importance, or of interest, being published in a condensed form. Deducting these, and the remaining original papers contributed by the Editor—nineteen in all—there remain forty-five papers, of which number eleven were contributed by only six members of the College, showing a greater lack of interest in the Journal on the part of the members of this College than has been experienced by the Editor during any one year since he had been first elected to this position fifteen years ago. Eight of these papers were read at the pharmaceutical meetings. The remaining original contributions consisted of nineteen papers containing more or less condensed abstracts of forty-two theses, and of fifteen valuable papers contributed by eight non-members.

The Editor desires to express his obligations to the contributors, and the hope of a continuance of their valued interest in the Journal.

Respectfully submitted,

John M. Maisch, *Editor.*

The report of the Committee on Publication was called, and, in response, the chairman submitted the following, which was, on motion, accepted and referred.

"The Publication Committee respectfully report that they have attended to the duties assigned them during the year just closed. The Journal has been issued with its usual promptness; the standard attained by the Journal as an able and faithful exponent of the progress of pharmacy and allied sciences, we think, has been maintained.

The vast number of pharmaceutical publications now issued, and the rigid supervision by the Committee of all advertisements, restricts, somewhat, our income from what might be a source of profit; but the admission of which, we think, would not be in accord with the objects for which the Journal was established. The Committee have endeavored to reduce the expense of publication as far as would be consistent with true economy—for that purpose they invited proposals for printing, and for paper, and binding. The changes made, while not impairing the quality and general appearance of the Journal will result in a considerable annual saving. We would call the special attention of all graduates of our College to the Journal as a desirable source of valuable and new information for them, and an excellent channel to communicate their scientific observations to the pharmaceutical world. The Editor's and Business Editor's reports, which accompany this, will give the details of our work.

Respectfully,

H. N. Rittenhouse, *Chairman Public. Com.*"

The Secretary here read a financial report of the Publishing Committee as shown by the statement of the Business Editor, as also an accompanying similar report of the Treasurer of the Committee, which latter was, by motion, directed to be placed on the minutes. This report gives, as has been noted, the business condition of this department of the College, and presents a very satisfactory statement. The account had been audited and vouched. In order to adjust these accounts, and furnish the Publication Committee with the usual available capital, orders were, on motion, directed to be drawn on the Treasurer of the College, and on the Treasurer of the Publication Committee, respectively.

The Committee on Deceased Members reported the decease of Peter Williamson, one of the original members of the College, and secretary of the meeting held February, 1821, at which the College was organized. A full report on his life will be presented at a subsequent meeting.

The Treasurer of the College reported the names of two members, delinquents in payment of dues; on motion of Mr. Robt. England, these gentlemen were debarred from further membership.

A communication was received from Isaac Tull, now resident of Kingston, N. C., resigning membership, which resignation was, on motion, accepted.

William McIntyre, in a communication, presented his resignation as a member of the Board of Trustees, assigning want of time to properly attend to the duties. On motion of William B. Webb the resignation was accepted.

This being the date of the annual meeting, the President ordered an election to be held for Officers, Trustees, and Standing Committees. The election resulted as follows:

President, Charles Bullock. *Treasurer*, Samuel S. Bunting.
1*st Vice-President*, Robt. Shoemaker. *Recording Sec't'y*, William B. Thompson.
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Editor, John M. Maisch. *Librarian*, Thos. S. Wiegand.

Curator, Chas. Fred. Zeller.

The gentlemen here designated were appointed by the Chairman as delegates to the Pennsylvania Pharmaceutical Association, which meets at Lebanon, in June: Alonzo Robbins, Gustavus Pile, Wallace Procter, C. F. Zeller and Henry Trimble.

The meeting now, on motion, adjourned.

William B. Thompson, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 16, 1886.

The sixth meeting of the series was called to order by the actuary, and Mr. Wm. B. Thompson was elected chairman. The minutes of the last meeting were read, and, requiring no corrections, stand approved.

The report of the Commissioner of Education for the years 1883 and 1884 was presented by the actuary, it having been received since last meeting. It was directed to be placed in the library.

A paper on *Syrupus Aurantii*, by Geo. M. Beringer, Ph.G. of Class 1880, was read by the actuary, and, on motion of Mr. England, was referred to the Publication Committee. The reading elicited quite a discussion upon the subject. Mr. Heinitsh stated that it was his custom to keep a stock bottle of tincture made from fresh peel, and thus was enabled to prepare a syrup at all times. Mr. Robert England stated he was in the habit of making a tincture of the fresh peel deprived of the inner portion with a mixture of two parts of alcohol and one of water, using about two ounces of the fresh peel to ten ounces of fluid and making the measure up to a pint with sugar; this is used almost exclusively in the soda water department, or for flavoring in prescriptions, and really is more of an elixir than a syrup. Mr. Zeller was asked whether it was not thought necessary to have a syrup that was pharmaceutically compatible with the various remedies frequently prescribed in such connection. This was answered by the statement that the syrup made as suggested, did not react unfavorably with the ferruginous salts.

Mr. Walling asked if any of the members had found trouble from the presence of *ultramarine in sugar;* it has been a source of annoyance to him, not only as introducing a foreign color, but giving after a short time an odor resembling that of stale eggs. The same question had been asked at one of the recent meetings by Mr. Procter, and Mr. Webb said that one large refiner stated that he did not use ultramarine, but analysis showed an abundance of it present in the sugar sold by this firm. Several members said that the sugar refined at the Franklin refinery did not show it, but one present who had used five times as much as almost any other present, had been greatly annoyed by it when using this brand. Mr. England stated that he had gotten rid of the ultramarine by adding a small amount of isinglass dissolved and added to the syrup which then had to be boiled. This acted thoroughly well.

Mr. Walling asked what substance could be advantageously used as a *deodorizer* to a liquid in which raw hides had been steeped; the discharge of this water into the sewers gave great offence to some of the neighbors, and it was desirable to be able to prevent the ground of complaint. Sulphate of iron in solution slightly acidulated was recommended to be tried.

Mr. Thompson exhibited *crystalline carbonate of ammonium* which he thought desirable for filling smelling bottles, as it retained its strength as long as the salt remained. It was made by placing ordinary carbonate of ammonium in a jar and covering it with strong water of ammonia; after standing a long time—for it had been forgotten—it was found to be crystalline and quite dry when freed from the surrounding liquid.

There being no further business, on motion adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy. The plan of holding two monthly examinations for the junior students, with the view of determining their progress and their fitness for entering upon the final junior examination, at the end of the course, was again followed during the past session, and its efficiency, as well as its advantage to the students, proved, in the main, satisfactory. The questions at the two preliminary and the final junior examination, which latter was held on Saturday, February 13th, were as follows:

BOTANY AND MATERIA MEDICA.

1. Explain the manner of length-growth of the *root* and of the *rhizome.* How may a rhizome be distinguished from a root by external marks and by the structure?

2. Name and describe briefly the *tissues* found *in leaves,* commencing with the upper surface.

3. What is meant by *definite,* and by *indefinite inflorescence?* Give several forms of each kind, and briefly describe them, or illustrate them by diagrams.

4. Define a *fruit,* and give the characters of the following kinds of fruits, stating in each case the nature of dehiscence: *Berry, Drupe, Pome, Follicle, Legume, Capsule.*

5. *Levant Wormseed.* Give the officinal name of the drug; the part used; the name of the plant, its habitat and its natural order. Describe the drug, and state how it may be readily distinguished from American Wormseed. What are its medicinal properties, and in what doses is it given? Name its active principle; state the effect of light upon this principle, and the medicinal dose of the latter.

6. How do *monocotyledonous plants* differ from dicotyledonous plants in the arrangements of the woodbundles in the stem; in the venation of the leaves and in the embryo. Name some of the natural orders belonging to the monocotyledons; also some medicinal or otherwise useful products yielded by each one of the natural orders enumerated by you.

PHARMACY.

1. If the *specific gravity* of hydrochloric acid is 1.160, what will be the *weight* in grammes of a litre? What will be weight in grains of 500 c. c. of the acid.

2. Write out a description of a *pharmaceutical balance* of the most approved construction, explaining and answering the following queries, adding such information as you deem necessary to complete the description: What should be the relation of the centre of gravity of the beam to its point of suspension? What should be the relative distances between the knife edges? Should the knife edges be absolutely parallel to each other, why? What influence has the weight of the beam upon the sensibilities of the balance? Why should the beam be rigid? How would you test a balance to prove its proper construction?

3. If the *weight* of a fluid ounce of each of the officinal liquids is as stated below, what is the *specific gravity* of each liquid?

Phosphoric Acid	613.8 grains.
Diluted Sulphuric Acid	486.3 grains.
Glycerin	569.6 grains.
Mercury	6151.9 grains.
Water	455.7 grains.

4. Write a composition on the subject of *Percolation,* using your own language, and treating the subject under the following heads: *a.* Definition. *b.* History. *c.* Principle of Action. *d.* Advantages over Maceration. *e.* Description of Percolators and Their Special Uses.

5. Explain the officinal process for making *Acidum Phosphoricum* and *Acidum Phosphoricum Dilutum*; name and give the tests for three kinds of phosphoric acid which differ from each other in chemical composition.

6. How is *Sulphurous Acid* prepared for use in Pharmacy? Explain the officinal process.

CHEMICAL PHYSICS AND CHEMISTRY.

1. What is the general effect of *heat* upon all bodies? What is meant by "latent heat"? In what changes of condition is heat rendered latent? Explain the action of a mixture of salt and ice in lowering the temperature.

2. What difference is there in the *electricity* developed by friction, and that developed by chemical action? Describe several of the more important forms of *galvanic batteries?* Which of the batteries mentioned develops the greatest electromotive force?

3. State the distinction between a *binary* and a *ternary molecule.* When is the termination *ide* used? When *ite?* When *ate?* Give examples in each case.

4. What elements belong to the *halogen group?* What is their equivalence? Write the formulas of their hydrogen compounds.

5. What is the chemical formula of *Ammonia*, and what of *Sal Ammoniac?* Write the reaction by which the former is produced from the latter. From what sources may ammonia be obtained?

6. Give the names, chemical formulas and a brief description of the *oxides of Carbon.* What acids are formed from these oxides? Name the salts corresponding and give the chemical formula of one of such salts.

QUESTIONS BY THE EXAMINING COMMITTEE.

1. Describe and illustrate by diagram each of the following forms of *Inflorescence*: Spike, Raceme, Corymb, Umbel. Name the different parts of a *complete flower.* Mention three *officinal flowers*, and give the botanical name and natural order of the plants yielding them.

2. Define *quantivalence* or *equivalence.* Give examples of univalent, bivalent, trivalent and quadrivalent atoms. How can the quantivalence of an element be indicated in its symbol?

3. Give the process including the ingredients used in the officinal *Liquor Magnesii Citratis.* Exemplify the reaction which takes place by the use of symbols.

4. Describe the processes of *Sublimation* and *Distillation.* Give an example of each process. What is the difference between *Solution* and *Fusion?* Give an example of each process. Describe *Incineration* and *Lixiviation* and give an example of each.

Specimens.

Chondrus.	Aqua Menthæ viridis.	Aqua Chlori.
Cannabis indica.	Tinctura Gentianæ comp.	Potassii Iodidum.
Caryophyllus.	Acidum Sulphuricum arom.	Ammonii Chloridum.
Arnicæ flores.		

The examination in *Operative Pharmacy* consisted in the making of several preparations requiring the practical application of the processes of percolation, solution and evaporation.

The re-examination of those junior students who failed in the February examination in one or more branches will be held on Wednesday afternoon, September 29th, next, at 3 o'clock.

The examination of the senior students was commenced on Thursday, February 25th, and closed on Tuesday, March 2d, with the practical branches of operative pharmacy and analytical chemistry, as follows:

MATERIA MEDICA.

A. From what plants is *Bryonia Root* obtained? Give their natural order and habitat. Describe the drug, including its structure. State its medical properties and dose. What *other drugs* are obtained from the same natural order? Give the medical properties and dose of each.

B. Name the plant yielding *Pink-root.* Give the natural order and habitat of the plant. Describe the drug, including its structure. Name the principal constituents. Give its medical properties, dose, and effects of an overdose. What other article is sometimes sold for the officinal pinkroot, and how may it be distinguished from the latter? In what manner does *Serpentaria* differ, physically, from pinkroot?

C. What is *Butternut Bark?* Name the plant, its natural order, and habitat. When should the drug be collected? Describe the drug, including its structure. Name its principal constituents. Give the medical properties and dose. State the effect of continued boiling upon the virtues of the drug.

D. What is *Jaborandi?* Name the plant, its natural order and habitat. Describe the drug. Give its medical properties and dose. Name an officinal salt, prepared from Jaborandi. State the dose of the salt, and some of its characteristics. How may the leaves of *Laurus nobilis* be distinguished from Jaborandi?

E. What is *American Wormseed?* Name the plant from which it is procured. Give the natural order and habitat of the plant. Describe the drug. Give its medical properties and dose. Also the officinal name, characteristics and dose of its active principle. How may American Wormseed be distinguished from *Levant Wormseed?*

F. What is the botanical name of the *Almond tree?* Its natural order and habitat? Describe the seeds, including their structure. State the difference in the appearance of the two varieties of almond. Name the constituents found in both varieties, and give the proportion of that constituent obtained by expression. Which variety yields a volatile principle, and in what proportion? How is this volatile principle produced? What is its chemical nature? What compound is formed from it on exposure to air?

G. What is *Mace?* Give the botanical name of the plant. Its natural order and habitat. Describe the drug. Give its medical properties and its constituents. What is *Nutmeg?* Give the proportion of its important constituents, and the characters of the volatile principle.

H. Name some of the plants yielding *Aloes,* giving their habitat, and the commercial varieties of aloes yielded by each. How is aloes prepared? Which variety is officinal? Describe the officinal aloes, and state the effect of solvents, and what impurities are frequently present. How do other varieties differ from it? Give a process for preparing aloin.

I. In what tissue is the juice contained which yields *Opium?* How is opium prepared? Describe the officinal opium. State how Persian opium differs from it. How may the following adulterations be detected: starch, gum, extracts? What is the morphine strength of pharmacopœial opium? Give characteristic tests for the following constituents; morphine, codeine, meconic acid.

K. Give the name, class and habitat of the *Muskdeer.* Describe the *musk-bag,* and its location on the animal. Give the characteristics of good *musk.* State how adulterations may be detected? How may the odor of musk be removed? Give the medical properties and dose of musk.

THEORY AND PRACTICE OF PHARMACY.

A. Name three officinal liquids for which processes are given in the Pharmacopœia, which have identical specific gravities. How many avoirdupois pounds are contained in a wine-gallon of either of them. Give the outlines of the method of preparing each.

B. Give the unabbreviated officinal names, ingredients, outlines of processes, and describe the appearance of the following: *Soap Liniment, Syrup*

of Lactophosphate of Calcium, Honey of Rose, Diachylon Ointment, Blistering Cerate, Strengthening Plaster, Aromatic Spirit of Ammonia, Neutral Mixture.

C. Give the English names, ingredients, outlines of process, and describe the appearance of the following: *Infusum Sennæ Compositum, Liquor Potassii Arsenitis, Pulvis Morphinæ Compositus, Syrupus Senegæ, Tinctura Benzoini Composita, Liquor Plumbi Subacetatis, Pilulæ Ferri Iodidi, Massa Ferri Carbonatis.*

D. Give the officinal name, with the ingredients and quantities to make one pint of *Fluid Extract of Veratrum Viride* and *Tincture of Opium.*

E. What is *Glucose?* How does it differ from commercial *Grape Sugar?* Give its chemical formula. How is *Glucose* made commercially? What are its principal uses? Give a distinguishing test for it.

F. Give the manufacturing processes, specific gravity, tests of identity, and purity of *Glycerin, Commercial Chloroform,* and *Nitrite of Amyl.*

G. Give the reasons for the following:

1. In the preparation of officinal tincture of *Chloride of Iron,* why is it directed that the mixture of solution of *Chloride of Iron* and *Alcohol* shall stand in closely covered vessels for three months before being used?

2. Why is test solution of *Nitrate of Barium* directed to be used in testing officinal *Honey?*

3. Why is *Water of Ammonia* added to the liquids used in making the following preparations: *Pure Extract of Glycyrrhiza, Fluid Extract of Senega, Washed Sulphur.*

4. Why is *Calumba* directed to have the special degree of fineness of powder known as number 20 in the officinal formulas, for its liquid preparations, instead of the usual degree of fineness of powder directed for other drugs?

4. Why is diluted *Hydrochloric Acid* directed in the officinal liquid preparations of *Conium?*

H. Define *incompatibility* in its pharmaceutical relations, as applied to extemporaneous solutions. Is incompatibility ever intentional on the part of the prescriber? Illustrate by an example. When should an extemporaneous solution ordered by a physician be filtered, and under what circumstances is it improper to filter such a solution? Is it important to observe any particular order in mixing the ingredients in certain liquid prescriptions? If so, illustrate by an example.

I. What is the physical property that is possessed by *Cacao Butter* that makes it the best basis for *suppositories?* Describe the process of making rolled suppositories by hand. What advantage have moulded suppositories over those made by rolling?

K. State briefly the essential physical requirements of a good *pill mass.* Under what circumstances does a pill cylinder sometimes split or crumble when rolled? How may a pill cylinder, which is known to be liable to split or crumble, be manipulated (without additions of any kind) so as to avoid such a mishap? State the kind of medicinal substances with which it would be proper to use the following pill excipients: *Water, Syrup, Glucose, Confection of Rose, Glycerin, Soap.* Describe briefly the processes for *coating pills* with gold or silver leaf, sugar and gelatin.

CHEMISTRY.

A. What are the several processes now in use for manufacturing commercial *Carbonate of Sodium?* Give an outline of each. What are the side products in each case?

B. What is the officinal name and chemical formula of *Epsom Salt?* What is the officinal name and chemical formula of *Glauber's Salt?* State the difference in physical properties between the two. What chemical tests would serve to distinguish between them? How can you distinguish between *Zinci Sulphas* and *Epsom Salt*?

C. Describe the metal *Lead.* Mention the technical uses of the metal and its alloys. Mention the salts of Lead that are used in pharmacy, and those that are used in technical applications. Give the chemical formulas of three officinal compounds of Lead.

D. Give the chemical names and formulas of *Hydrargyri Chloridum Mite, Hydrargyri Chloridum Corrosivum* and *Hydrargyrum Ammoniatum.* State the points of difference between them, and the tests for each, and means of separating them when all are present in a mixture.

E. What tests are characteristic for *Bismuth Salts?* Write the chemical formulas of the normal nitrate and the subnitrate. State how each is produced. Give the formula of the subcarbonate, and state how it is produced.

F. What is the general composition of the natural *fats?* What compounds predominate in the solid fats? And what in the liquid fats? Write the chemical reaction for the decomposition of the fats by superheated steam. Write the reaction for the formation of a soda soap. Write the reaction for the formation of lead plaster.

G. Give the chemical formula of *Acidum Aceticum*, and two officinal acetates. Of *Acidum Oxalicum*, and two officinal oxalates. Of *Acidum Tartaricum*, and two officinal tartrates. Of *Acidum Citricum*, and two officinal citrates.

H. Define the class of changes known as *fermentations*, and state what organic compounds are specially subject to them. Enumerate the special varieties of fermentation, and state the products in each case. Write the chemical reactions expressing the changes that take place in these cases.

I. Give the chemical formulas of *Acidum Benzoicum, Acidum Salicylicum* and *Acidum Gallicum.* What chemical relationship exists between these three acids? State the sources, both natural and artificial, of these several acids.

K. What is a *Glucoside?* What is an *Alkaloid?* What differences are there in the chemical constitution of the two classes? What analytical tests will show the difference between the two classes?

QUESTIONS OF THE EXAMINING COMMITTEE.

A. Name three *acids of Phosphorus.* State briefly the difference in chemical formula between the three varieties of Phosphoric Acid. Explain how the higher varieties may be changed into the lower. Give the basicity of each acid, and state the variety to which the officinal Phosphoric Acid belongs. Name the officinal Phosphoric Acids, and give the specific gravity and percentage of absolute acid in each.

B. From what source is *Antimony* obtained? Describe the physical characteristics of the metal. State the chemical composition of *Tartar Emetic.* Name the officinal preparations into which *Tartar Emetic* enters, and give the amount in each. What other preparations of *Antimony* are officinal? What preparations of *Arsenic* are officinal? Name the officinal liquids which contain *Arsenic*, and give the *Arsenic* strength of each. What is the dose of *Arsenious Acid?* What is the antidote for *Arsenic?* What are the tests for *Arsenic*, and the means whereby it can be distinguished from *Antimony?*

C. Name the ingredients and quantities which enter into the composition of *Compound Cathartic Pills.* Give the botanical name, natural order, habitat and officinal portion of the plants yielding the *vegetable* constituents thereof.

D. What is the effect of adding *Hydrochloric Acid* to solutions of [a]*Mercurous*, [b]*Mercuric*, [c]*Lead*, and [d]*Silver Salts?* Give the formula of each of the resulting compounds, and state by what tests they may be distinguished from one another. How may *Corrosive Sublimate* be detected in *Calomel?*

E. Name and describe the officinal products yielded by *Gossypium herbaceum.* Give the unabbreviated officinal name, ingredients, and outlines of process, of each preparation into which they enter. What therapeutical properties are attributed to each of these preparations? Give the chemical formula and characteristic properties of each of the three products of the action of *Nitric Acid* on *Cotton.* What is *Pyroxylin* chemically?

F. Name four officinal solutions of the Salts of Iron. Give the process for the preparation of each, and explain the chemical reactions which occur.

G. Give the officinal and common names of the medicinal substances obtained from each of the following. State what portion in each constitutes the officinal drug. Name an officinal preparation (if any) into which each one enters: *Crocus sativus, Gadus Morrhua, Cassia elongata, Myroxylon Pereiræ, Croton*

Eleuteria, Fraxinus Ornus, Acipenser Huso, Illicium anisatum, Physeter macrocephalus, Allium sativum.

H. How would you distinguish by chemical tests the *Iodide* from the *Bromide of Potassium? Heavy Magnesia* from the *Precipitated Carbonate of Calcium?* Powdered *Borax* from the *Bi-Carbonate of Sodium? Epsom Salt* from the *Sulphate of Zinc?*

I. Criticise the following prescriptions, and state whether you would dispense them.

1. ℞ Potass. Iodid..... ℥iv
 Hydr. Bichlorid..... gr. iss
 Strych. Sulph..... gr. i
 Morph. Sulph..... gr. ii
 Syrup. Zingiber..... f℥ii
 Aquæ..... f℥i
 Ft. Mist.
 Sig.—A teaspoonful after meals.

2. ℞ Tinct. Ferri Chlorid.
 Syrup. Simp.....ãã ℥iv
 Elixir Aurant..... ℥i
 Morph. Acetat.
 Acid. Acetic. Dil.....ãã ℥i
 Liq. Ammon..... ℥iv
 Ft. Mist
 Sig.—A dessertspoonful every hour.

3. ℞ Sodii Bicarbonat.
 Hydrarg. Chlorid. Cor...ãã gr. v
 M. Ft. chart. No. i
 Sig.—Take at once.

K. How would you prepare this prescription? Would you dispense it?

4. ℞ Strych. Sulph..... gr. iss
 Aloin..... gr. iii
 Iodin..... gr. v
 Ferri Reducti..... ℥ i
 Ext. Quassiæ gr. xlv
 Ft. pil No. xxx.
 Sig.—Take one pill after each meal.

Criticise this prescription and state whether you would dispense it:

5. ℞ Potass. Cyanid..... ℥ ii
 Morph. Sulph..... gr. ii
 Acid. Citric..... ℥ ii
 Syr. Prun. Virgin..... f℥viii
 M. Ft.
 Sig.—For cough, take a teaspoonful every four hours.

Write out a direction for the preparation of this prescription, and state whether you would dispense it:

6. ℞ Acid. Arsenios..... grs. ii
 Potass. Bicarbonat..... grs. ii
 Tinct. Lavand. Comp... ℥ vj
 Aq. Destil..... grs. cxcv
 M. Sec. Art.
 Sig.—Give five drops three times daily.

Specimens.

MATERIA MEDICA.

Ipecacuanha.
Aconitum.
Santalum rubrum.
Cascarilla.
Castanea.
Buchu (short).
Cannabis indica.
Pimenta.
Staphisagria.
Ergota.

CHEMISTRY.

Potassii Iodidum.
Sodii Hyposulphis.
Ammonii Chloridum.
Plumbi Oxidum.
Cupri Acetas.
Zinci Acetas.
Acidum Citricum.
Amylum.
Alcohol.
Benzinum.

PHARMACY.

Pulvis Rhei comp.
Aqua Fœniculi.
Infusum Digitalis.
Vinum album fortius.
Tinct. Gentianæ comp.
Tinctura Vanillæ.
Extract. Ergotæ fluid.
Extractum Gentianæ.
Massa Ferri Carbonatis.
Sodii Salicylas.

COMMITTEE.

Valeriana.
Scoparius.
Prunus virginiana.
Resina.
Anisum.
Acetum Scillæ.
Aqua Menthæ pip.
Liniment. Saponis.
Potassii Nitras.
Sodii Boras.

OPERATIVE PHARMACY.

1. *Suppositories.*

℞ Ext. Stramonii.
Acidi Tannici.....ãã gr. iij
Plumbi Carb..... gr. vj
Liq. Plumbi S. Acet..... gtt. xij
Creasoti. gtt. iij
Ol. Theobromæ..... gr. c

Make six suppositories by rolling, without moulds.

2. *Solution.*

Ferri Sulph.. 480 gr.
Acidi Sulphurici 1 fl. dr.
Acidi Nitrici..... 1 fl. dr.
Aquæ q. s. ft..... 2½ fl. oz.

Sig.—Make Solution of Tersulphate of Iron by the officinal process.

Ointment.

3. Hydrargyri.....gr. xxxvij.
Acidi Nitrici..... ½ fl. dr.
Acidi Nitrici..... ¾ fl. dr.
Ol. Adipis..... 1 fl. oz.

Make Ointment of Nitrate of Mercury by the officinal process.

Pills.

4. ℞ Ext. Coloc. Comp.....gr. xxiv.
Abstract. Jalapæ.....gr. xviij.
Hydrarg. Chlor. Mit....gr. xviij.
Cambogiæ Pulv.....gr. iv.

Make 18 pills.

Powders.

5. ℞ Acidi Tannici.....gr. xii.

Ft. pulv. et div. in chart. No. XII.

In *Analytical Chemistry* the candidates were required to analyze qualitatively a solution containing from four to six different salts of mineral and organic acids.

Twelve candidates were present (fourteen entitled) in the competitive examination of drugs with the microscope for the John M. Maisch prize, they having attained the grade very satisfactory in the examination in materia medica, including specimens. Mr. J. L. Fisher recognized the largest number, nine out of the following thirteen microscopic specimens, most of them tranverse sections: Ipecacuanha, Menispermum canadense, (rhizome), Cimicifuga (rootlet), Dulcamara, Salix, Caryophyllus, Carum, Aurantii cortex, Stramonii semen, Kamala, Calumba, Veratrum (rhizome) and Cascarilla.

The following 172 candidates passed successfully in all branches and were recommended to the Board of Trustees for the degree of Graduate in Pharmacy (Ph. G.):

Abell, Wm. Warner, Pennsylvania, *Pimentæ Folium.*
Adams, Ellsworth Smith, New Jersey, *Troches.*
Albright, Charles Wesley, New Jersey, *Chloral-Camphor.*
Alexander, Everett Vincent, Ohio, *Starch.*
Arnold, Claude Horace, New York, *Potassii Bitartras.*
Backes, Thomas Joseph, Pennsylvania, *Cinchonidinæ Sulphas.*
Baker, David Wiley, New Jersey, *Hæmatoxylon.*
Barlow, Louis Eugene, Ohio, *Cork.*
Barrowman, Wm. G., Pennsylvania, *Oleum Olivæ.*
Becker, Harry Vane, Indiana, *Chloral and Menthol.*
Bell, Robert Matthew, Pennsylvania, *Hydrastis Canadensis.*
Berret, Arthur, New Jersey, *Imperfect Officinal Syrups.*
Bickley, Milton Horace, Pennsylvania, *Pycnanthemum Linifolium.*
Bicknell Robert Cooke, Tennessee, *Chlorinated Lime.*
Birt, Frank John, New Jersey, *Gossypium.*
Bonnet, Charles Frederick, Ohio, *Myristica.*
Bowman, Lin Light, Pennsylvania. *Anæsthetics.*
Boyd, John Charles, Illinois, *Dialysed Iron.*
Braddock, Jr., Charles Shreve, New Jersey, *Aluminum.*

Brecht, Morris Winfield, Pennsylvania, *Pharmaceutical Requisites.*
Brown, Albert Edward, Illinois, *Erythroxylon and Derivatives.*
Brown, Frank L., Pennsylvania, *Suppositories.*
Buckley, James Edward, Washington Territory, *Cerates and Ointments.*
Bullock, William Anthony, Pennsylvania, *Relation of Pharmacy to Physics.*
Burg, John Dellinger, Pennsylvania, *Olives and Olive Oil.*
Burke, Wm. Thompson, Pennsylvania, *Compounds in Pharmacy.*
Burkhart, Herman Adolphus, Pennsylvania, *Chlorophyll.*
Cafky, Wm. Walter, Illinois, *Boroglyceride.*
Cahill, Daniel Wm., New York, *Fraxinus Americana.*
Campbell, Harry Belting, New Jersey, *Calendulated Boric Acid.*
Cheney, Walter Bowden, Connecticut, *Hamamelis Virginica.*
Cohen, Nathan Alexander, Pennsylvania, *Hamamelis Virginica.*
Cohn, Arthur H., Wisconsin, *Smilax Rotundifolia.*
Colborn, Isaiah Grant, Pennsylvania, *Hydrochlorate of Cocaine.*
Commings, Charles Samuel, Pennsylvania, *Honey.*
Craig, Edwin Sherman, Ohio, *Glycerinum.*
Dallett, Prosper Martin, Pennsylvania, *Pills.*
Danzberger, George Wm., Pennsylvania, *Responsibilities of a Pharmacist.*
Davis, Alfred Ivins, New Jersey, *Druggists' Clerks.*
Davis, William Harry, Pennsylvania, *Glycerinum.*
Deibert, Thomas Irwin, Pennsylvania, *Kalmia Angustifolia.*
DeKalb, Hugh Leonard, Pennsylvania, *Quinine Pills and Excipients.*
Donough, Wm. Edgar, Pennsylvania, *Toxicology.*
Downes, Clarence Eugene, Maryland, *Boroglyceride.*
Downes, Randolph Hinson, Maryland, *Electricity.*
Drew, A. Damer, Virginia, *Nickel and its Haloid Salts.*
Duffie, Silas Johnstone, South Carolina, *Syrup of Tolu.*
Dunn, Frederick, Pennsylvania, *Syrupus Ipecacuanhæ.*
Dunn, Walter, Pennsylvania, *Digitalin.*
Eisenhart, Foster Benjamin, Pennsylvania, *Creosote.*
Escott, Charles Edward, Michigan, *Gum from Myrrh.*
Evans, George Brinton, Pennsylvania, *Camphor Water.*
Fahey, Edward H., Delaware, *Vanilla.*
Fetter, Harry Herman, Pennsylvania, *Arsenicum.*
Fischer, Albert Martin, Pennsylvania, *Brayera Anthelmintica.*
Fisher, Jacob Livingood, Pennsylvania, *Ustilago Maydis.*
Fletcher, Oscar Conrad, Kentucky, *Colleges of Pharmacy.*
Flynn, John Joseph, New Jersey, *Resins and Oleo-Resins.*
Fritsch, Harry, Pennsylvania, *Podophyllin.*
Gardner, Frank Edwin, Pennsylvania, *Aquæ Medicatæ.*
Giffin, Harry Riggeal, Pennsylvania, *Vanilla.*
Grant, James Smith, Maryland, *Isinglass and its Adulterations.*
Greenawalt, Wm. Grant, Pennsylvania, *Botany and its Value to Pharmacists.*
Hall, Frank Devie, Ohio, *Sulphur Præcipitatum.*
Hall, Harry Newbury, Mexico, *Camellia Thea.*
Harrigan, John William, Pennsylvania, *Percolation of Resins and Gum Resins.*
Hauck, Allen Wesley, Pennsylvania, *Present of Pharmacy.*
Heim, Henry Lewis, Pennsylvania, *Grindelia.*

Heller, Charles Tompkins, New Jersey. *Bryonia.*
Henderson, James Rutledge, South Carolina. *Gossypium Herbaceum.*
Herring, Doane, North Carolina, *Sulphate of Manganese.*
Hewitt. Charles Ellsworth, Indiana, *Lappa Officinalis.*
Hiecke, William, Wisconsin, *Analysis.*
Hiestand. John Summy, Pennsylvania, *Aspidosperma Quebracho.*
Hinkle, James, New Jersey, *Coccus.*
Hinterleitner, George Gustav, Pennsylvania, *Detannation of Cinchona Preparations.*
Hoffman, George Wm. Jacoby, Indiana, *Fraxinus Americana.*
Holberg, Ferdinand, Mississippi, *Nance Bark.*
Holland, Edgar Atwood, Pennsylvania, *Pharmacy.*
Hulshizer, John Clayton, New Jersey, *Cypripedium Pubescens.*
Johnson, Seth Caleb, New Jersey, *Potassii Bitartras.*
Johnson, Frank Elmer, Pennsylvania, *Electricity.*
Jones, Samuel Stephen, Pennsylvania, *Xanthorrhiza Apiifolia.*
Kalteyer, Moritz, Texas, *Sophora Speciosa.*
Kelly, Wm. Daniel, Minnesota, *Chloride of Cocaine.*
Keogh, Francis Joseph, Pennsylvania, *Celluloid.*
Keyes, Frank Williamson, Pennsylvania, *Vanilla.*
Kiedaisch, Jr., John Frederick, Iowa, *Myrrha.*
Kieffer, Otto, de, Pennsylvania, *Coca.*
Kirkham, Walter Agan, Pennsylvania, *Useful Hints to the Pharmacist.*
Kizer. Thomas Joseph, Indiana, *Eriodictyon Californicum.*
Klopfenstein, John A., Ohio, *Coto.*
Knight, Howard, Pennsylvania, *Pharmaceutic Appliances.*
Knisell, Sidney Lackey, New Jersey, *Our Profession.*
Koch, Charles Herman, Pennsylvania, *Emulsions.*
Kroh, Harry Kieffer, Pennsylvania, *Pepsin vs. Bismuth.*
Kurtz. David Haines, Pennsylvania, *Salix Alba.*
Lafean, Edward Charles, Pennsylvania, *Aromatic Syrup of Rhubarb.*
Lammer, Jr., Francis Joseph, Pennsylvania, *Extracts.*
Lawrence, Samuel Comfort, New Jersey, *Permanganate of Potassium.*
Loewenthal, Wm. A., Indiana, *Medicated Wools.*
Loughead, Raymond Blythe, Pennsylvania, *Percolation.*
McBath, Wm. Andrew, Tennessee, *Syrup of Lactucarium.*
McCarthy, Cornelius Joseph, Pennsylvania, *Pharmaceutical Associations.*
McConnell, Charles Henry, Pennsylvania, *Coke.*
McCoy, Clarence Herbert, Illinois, *Assay of Cinchona.*
McFarland, Thaddeus Day, Ohio, *Fructus Lappæ.*
Mallon, James Peter, Pennsylvania, *Aniline a Test for Alcohol.*
Marbourg, John George, Pennsylvania, *Pepo.*
Maurer, George Bright, Pennsylvania, *Seeds.*
Means, Samuel Robert, Pennsylvania, *Arsenic.*
Meek, William Henry, Massachusetts, *Officinal Salts of Lithium.*
Medd, Henry, England, *Pharmacy in England.*
Melot, Irvin G., Pennsylvania, *Iodoform.*
Moeszinger, Philip Pierre, Iowa, *Cinnamomum Camphora.*
Moffitt, Edward Thomas, Pennsylvania, *Xanthoxylon Fraxineum.*

Moore, John Demuth, Pennsylvania, *Guilandia Bonduc.*
Morrett, William Henry, Pennsylvania, *Trochisci Potassii Chloratis.*
Morrison, James, Pennsylvania, *Suppositories.*
Munson, James Harry, Pennsylvania, *Preparations of Yerba Santa.*
Nebig, William George, Pennsylvania, *Menthol Pencils.*
Neely, Charles Godfrey, Pennsylvania, *Trifolium Pratense.*
Neil William Edgar, West Virginia, *Sophora Speciosa.*
Oetinger, Albert, Pennsylvania, *Elixir Cinchonæ Calisayæ.*
Ohl, William, Illinois, *Effect of Heat on Opium.*
Pantzer, F. Will, Wisconsin, *Damiana.*
Parrish, Collistus Mitchell, Pennsylvania, *Phytolacca Decandra.*
Pechin, Edward Vogan, Pennsylvania, *Vegetable Histology.*
Pechin, George Joseph, Pennsylvania, *Fibre.*
Pfaeffle, Robert William, Pennsylvania, *Spontaneous Change in Chemicals.*
Poehner, Adolph Adam, Germany, *Belæ Fructus.*
Post, Philip Van Riper, New Jersey, *Cimicifuga.*
Prewett, Samuel Washington, Tennessee, *Gelatin.*
Prickett, Frank W., Delaware, *Coccus.*
Pritchett, Harrison Hartwell, Virginia, *A Retrospect.*
Rambo, Samuel Lee, Ohio, *Bismuthi Subnitras.*
Reighter, Frank Clymer, Pennsylvania, *Euphorbia Pilulifera.*
Rentschler, Jr., Charles, Pennsylvania, *Tobacco.*
Ridington, William Augustus, Pennsylvania, *Conium Maculatum.*
Risher, Harry Cook, Texas, *Castile Soap.*
Roberts, Joseph Vonculin, Pennsylvania, *Chloral Hydrate.*
Roseberry, John Mackey, New Jersey, *Percolators.*
Rosenbaum, David, Indiana, *Plantago Major.*
Savage, Thomas Albert, Pennsylvania, *Acidum Boricum.*
Scarborough, Jr., George W., New Jersey, *Petrolatum.*
Scull, Andrew Stewart, New Jersey, *Sanguinarine.*
Shoemaker, George Washington, Pennsylvania, *Glucose.*
Smith, Frank F., New York, *Cacao Butter.*
Smith, Frank Luther, Iowa, *Antipyrine.*
Spalding, Charles, Texas, *Starch.*
Stager, Edwin Wesley, Pennsylvania, *Alcohol and its Origin.*
Stahler, Harry Lincoln, Pennsylvania, *Asclepias Tuberosa.*
Sunderland, Henry, Pennsylvania, *Fermentation.*
Supplee, William Edward, Pennsylvania, *Senna.*
Swanson, Charles Adolphus, New York, *Gossypium.*
Thompson, George Washington, Pennsylvania, *Carboxylate of Cocaine.*
Tidd, Harry, New Jersey, *Cochineal and Carmine.*
Trout, Winfield Scott, Pennsylvania, *Syrupus Ferri Iodidi.*
Vincent, Lorren Stiles, Michigan, *Musk.*
Wagner, William Finley, Pennsylvania, *Phytolacca Decandra.*
Ward, Christopher Columbus, New Jersey. *Hydrastis Canadensis.*
Ward, Joseph Poletus, Alabama, *Iodum cum Petrolato.*
Wayman, John Martin, West Virginia, *Aquæ.*
Weck, Charles Erastus, Kansas, *Chloral Hydrate.*
Wild, Charles Ferdinand, Pennsylvania, *Potassii Bromidum.*

Wilkinson, William John, Pennsylvania, *Glycerin.*
Williams, Joseph Pearson, Delaware, *Unguentum Zinci Oxidi.*
Wingender, Wendell Phillips, Pennsylvania, *Ergot.*
Yealy, James Frank, Pennsylvania, *Memory in Pharmacy.*
Young, Frank John, Michigan, *Equisetum Hyemale.*
Young, William Schrack, Pennsylvania, *Hydrargyrum c. Creta.*
Zieber, Paul, Pennsylvania, *Water as a Menstruum.*

In response to an invitation from the professors, a reunion of the graduating class with the officers and trustees of the college, took place in the museum on the evening of March 17th, when the Zeta-phi Society presented to Prof. Trimble a complete copy of Chambers' Encyclopædia, and to the Actuary, Thos. S. Wiegand, his well-executed portrait, and the Theta-delta-sigma Society presented Prof. Sadtler with a gold-headed cane.

The commencement took place at the Academy of Music on Thursday, March 18th, at noon. Although the Academy was not overcrowded, as is very generally the case on similar occasions when the exercises take place in the evening, the auditorium was comfortably filled with an audience evidently interested in the proceedings. The degree of Graduate in Pharmacy was conferred upon the successful candidates by the President of the College, Chas. Bullock. The recipient of the Procter prize, presented by Mr. C. Bullock, was C. E. Escott, and honorable mention was awarded to D. W. Cahill and J. L. Fisher, with the grade distinguished, and to T. J. Backes, M. H. Bickley, W. B. Cheney, A. D. Drew, W. G. Greenawalt, F. D. Hall, S. S. Jones and E. C. Lafean with the grade meritorious, as the general result of their examinations. The H. C. Lea prize, $100 for the most meritorious work in connection with the thesis, was presented by Mr. W. J. Jenks to S. S. Jones. The materia medica prize for the best histological examination of an American plant—a Zentmayer microscope—was awarded to M. H. Bickley, with honorable mention of the labor done by H. A. Burkhart and A. H. Cohn. The John M. Maisch prize, offered by Mr. J. H. Redsecker to the candidates passing the best examinations in materia medica, followed by an examination of sections of drugs by means of the microscope, was presented by Mr. T. M. Perot to J. L. Fisher, honorable mention being accorded to W. E. Neil, H. H. Pritchett, L. E. Barlow, D. W. Cahill, C. E. Escott, R. C. Bicknell, T. J. Backes, M. H. Bickley, S. S. Jones, G. W. J. Hoffman, W. H. Davis, E. S. Craig and S. W. Prewett. The Pharmacy prize, a gold medal, was awarded to M. H. Bickley for a very handsome collection of pharmaceutical chemicals and galenical preparations made by himself. Mr. Robt. Shoemaker presented the Operative Pharmacy prize, $25 offered by Mr. E. L. Boggs, of West Virginia, to F. D Hall; and Mr. W. B. Thompson a fine prescription balance, offered by Mr. H. J. Maris for the best examination in theoretical pharmacy to A. D. Drew. Honorable mention was made in connection with the Pharmacy prize, of T. J. Backes, J. E. Buckley and J. M. Roseberry; and in connection with the Operative Pharmacy prize, of J. L. Fisher, E. C. Lafean and D. Rosenbaum. The recipient of the Chemistry prize for analytical work, a Troemner analytical balance, was C. E. Hewitt, with honorable mention of the work done by S. S. Jones, J. L. Fisher, D. W. Cahill, W. B. Cheney, C. H. McCoy and J. D. Moore.

The valedictory address was delivered by Prof. Maisch, and the exercises,

which were enlivened with music, as customary, closed with the distribution to the graduates of numerous presents sent by their friends. That the former custom of lavishing upon the successful candidates costly bouquets and baskets of flowers is evidently on the decline, should be stated in this connection; more useful and permanent gifts are doubtless more apropriate to an occasion which marks the introduction of the student into the ranks of their chosen profession.

Alumni Association of the Philadelphia College of Pharmacy.—The annual reception to the graduating class was held at Natatorium Hall on the evening of March 16th, this being the first time that the exercises were held outside of the college building, the halls of which having proved to be inadequate for the attendance on such occasions. The President, Howard B. French, Ph.G., presided. The Alumni gold medal and the usual certificates for the best examination in each branch were awarded. The annual oration was delivered by C. B. Lowe, Ph.G.; the class oration by J. E. Buckley, of Washington Territory; the class history by J. P. Williams, of Delaware; and the future of the class was discussed by the class prophet, C. H. McCoy, of Illinois. A new feature was the awarding of a prize for an extensive and handsome collection of indigenous plants, and of the quizmasters' prize for the best examination in the senior quiz class.

In addition to the work done for the college in the past, the Alumni Association has commenced to labor for the erection of a new building in front of the college halls, and more in keeping with the large dimensions and with the usefulness of the latter.

In the place of the retiring President, Wallace Procter, Ph.G., Class 1872, was elected presiding officer.

The Albany College of Pharmacy held its fifth commencement on the evening of March 1st, the graduating class numbering ten.

Chicago College of Pharmacy.—The nineteenth annual commencement exercises took place on the afternoon of February 4th, at the Grand Opera House, when President T. H. Patterson awarded the diploma of the College to sixty-eight graduates, including one lady. The Alumni banquet to the graduates took place on the same evening at the Palmer House.

Maryland College of Pharmacy.—The thirty-fourth annual commencement was held at the Grand Opera House on the afternoon of March 18th, the degree of Ph.G. being conferred by President Dr. Jos. Roberts upon the following twenty-eight candidates: Chas. Ammen, A. M. Binau, J. Emory Bond, Chas. B. Chapman, T. Wilber Chelf, W. A. Conway, Chas. C. Cook, W. M. Fouch, William Goodrich, C. L. B. Hines, Alfred Lapouraille, William Lentz, Oscar F. Leonhard, J. S. McFee, Howard D. Mills, Chas. H. Moore, T. J. V. Morris, Dietrich F. Onnen, Oscar E. Ross, A. Row, George Ruhl, George A. Ruths, John M. Scott, Clarence R. Shryer, Henry C. Spetzler, W. H. Stewart, Silas A. Updegraff, and C. H. Ware. The prizes, consisting of gold medals, were awarded: first prize to C. Ammen; second to C. L. B. Hines; third to J. S. McFee; Simon analytical prize to T. W. Chelf; Practical Pharmacy prize to S. A. Updegraff; and Junior prize to A. F. Whiteside.

EDITORIAL DEPARTMENT.

Alcoholic Beverages Disguised as Medicines.—In a recent issue of the *Medical Record* we find the following:—

"That popular abomination known as 'Beef, Iron and Wine,' which is now sold so extensively, not only by druggists, but by tradesmen of various kinds, deserves a little special attention from the medical profession. It is an agreeable mixture to the sight and taste; its name is a triple combination of seductive mononyms; while, taken into the stomach, it acts as a gentle 'pick-up' to the worn and over-sensitive nerves of the ladies. It has, in consequence, become a popular if not a fashionable tipple, and is indiscriminately used to an extent that is, we believe, not entirely free from danger. Every medical man knows that the amount of actual beef or food in these various preparations is insignificant, and that it is the wine, after all, that makes them liked, and that leads so many persons to purchase their second bottle."

The abuse introduced many years ago with whisky pleasantly flavored with bitters and aromatics, and with gin recommended under various names as popular medicines, has been often the subject of reflection by those who feel more than a superficial interest in the progress of pharmacy and medicine. When the sale of these liquors, thinly disguised as medicines began to be transferred, to a considerable extent, from the counter of the pharmacist and druggist to the store of the grocer and liquor dealer, it marked only their natural flow towards more congenial channels. The advent of so-called elegant pharmacy, with its pleasant elixirs and allied preparations, introduced another form of alcoholic beverages thinly veiled as tonic medicines, and physicians and pharmacists hastened to spread their use, the former by prescribing and the latter by purchasing and dispensing them. It was but the natural course of affairs that the sale of such pleasant drinks, after their medicinal repu ation had been established, should be largely transferred to the patent medicine dealer, the grocer and others having no interest in pharmacy, and that in this way the pecuniary interest of both physician and pharmacist should be made to suffer, in addition to the evils that obviously are likely to follow the unrestrained use of such allurements.

While it would have been easier in the beginning to combat their spread of popularity, it seems to us that the ground lost may, to a considerable extent, be recovered by the physician avoiding to prescribe ready-made medicines, and instead thereof, formulating himself such combinations as may be adapted to his patients, and by the pharmacist in making an honest effort to supply the products of his own skill and labor, and to uphold to the fullest intent and purpose the formulas of the pharmacopœia, and where this authority is silent, the formulas elaborated and recognized by pharmaceutical associations. There can be no doubt that the national formulary of unofficinal preparations contemplated by the American Pharmaceutical Association, may and should become a powerful aid towards mitigating some of the apparent evils if physicians and pharmacists will not neglect their professional duties.

Pharmaceutical Legislation in Virginia.—By an Act, approved March 3d, the Virginia Pharmaceutical Association has been incorporated and is empowered to nominate a number of its members from whom the governor is to select the Board of Pharmacy. The law provides for the registration of qualified phar-

macists in a manner similar to other laws, by recognizing the rights of those who have had three years' experience in dispensing stores, by accepting as evidence of qualification the diplomas from Colleges of Pharmacy recognized by the State Association and by the examination of other candidates. Section 3 confers upon practising physicians the right to retail, compound or dispense medicine or poisons, or to open or conduct a pharmacy, etc.; yet registration does not appear to be required of them, and Section 10 exempts them from the provisions of the Act if they do not keep open shop. The annual renewal of registration is provided for, the fee being $1. The wilful adulteration or sale of adulterated drugs is made a misdemeanor, punishable by a fine not in excess of $100, in addition to which the name of a guilty pharmacist may be stricken from the roll, while a similar additional penalty is not provided for merchants, who, without registration, may sell (Sect. 3) quinine, potassium iodide, bromide and chlorate, and certain other drugs and medicines. The registration of the sale of poisons is limited to arsenic and its preparations, corrosive sublimate, white precipitate, mercuric iodide, potassium cyanide, hydrocyanic acid, strychnine and essential oil of bitter almonds; while correct labeling is required for a number of poisons, ecbolic medicines and "other deadly poisons," without, however, defining what are to be regarded as "deadly poisons."

The Board was promptly appointed and organized in Richmond, March 25, by the election of T. Roberts Baker, Richmond, as President, and E. R. Beckwith, Petersburg, as Secretary; the other members are R. Brydon, Danville; E. Warfield, Alexandria, and J. W. Thomas, Jr., Norfolk.

A law regulating the sales of morphine in Virginia was approved March 1. It is similar to corresponding laws recently passed in some other states, and requires that the wrappers shall be of a scarlet color, and that the labels shall likewise be scarlet and plainly lettered in white. The intention of the law is evidently to make conspicuous the vessels containing morphine or its preparations in the possession of others than pharmacists or physicans, and including the latter when purchasing morphine in the state. Whether the details will be practicable and tend to prevent mistakes, remains to be seen.

Drug Business in Indianapolis for Sale.—By reference to our advertising columns, we notice that the long established and favorably known wholesale and retail business of Messrs. Browning & Sloan, is offered for private sale during the present month.

OBITUARY.

Joshua B. Lippincott died in Philadelphia, January 5th, at the age of 74 years. He was the founder of the publishing house now known as the J. B. Lippincott Company, which published a number of medical and pharmaceutical works.

Professor Austin Flint, M. D., died in New York, in the 74th year of his age. Educated at Amherst and Harvard, he held professorships in Chicago, Buffalo, Louisville, New Orleans, and, since 1861, in New York and Brooklyn. Dr. Flint was widely and favorably known as a medical author, both at home and

abroad, and he had been selected to preside over the International Medical Congress, which is expected to convene in Washington in 1887.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

James A. Armstrong, Ph.G. (1855), M. D., served in the army during the war as surgeon, and practised in Camden, N. J. for about 15 years, holding during a portion of this time the offices of coronor, inspector for the state board of health and examiner in pension cases. He died suddenly October 30, 1885.

Henry W. Maitland, Ph.G. (1884), died suddenly in Camden, N. J., January 7, 1886, aged 26 years.

Thomas Noble, Ph.G. (1858), served as hospital steward during the war, and was afterwards in the revenue service and in the gas office of Philadelphia. His death occurred December 27, 1885, at the age of 47 years.

VARIETIES.

Tannate of Mercury containes a large proportion of metallic mercury and possesses a pronounced metallic taste. A medium dose is 0·2-0·3 grams and 0·5 grams may be administered without any inconvenience. One advantage claimed for the tannate is that it produces no disturbance of the digestive track. Casanon employed the the following formula:—Tannate of mercury, 3 grams; extract of liquorice, q.s.; divide into sixty pills. Two to be taken twice a day after food.—*Bull. gén. Thér.*, 1885.

Olive Oil as a Menstruum for Cocaine was recommended by Dr. Andrews, of New York, at a meeting of the American Ophthalmological Society. By the plan of dissolving cocaine in oil, longer contact of the remedy is insured, and a smaller quantity of it is required. Cocaine salts not being soluble in olive oil, the alkaloid should be used, only requiring a few minutes of gentle heating in a water-bath to dissolve it.

External Use of Lobelia Inflata.—Dr. V. N. Reichard highly recommends the use of lobelia (*Medical Times*, December 12. 1885) as a local application for indolent sores, chronic erysipelas, and especially in incise wounds, in which latter class of cases it acts as a hæmostatic and astringent. The mode of employment of lobelia for this purpose in cases of incised wounds, no matter how great the hemorrhage, provided. however, it does not require a ligature, is to bring the edges of the wound together, and to hold them for a few moments, while a pledget of cotton, wet with tincture of lobelia, is applied. Dr. Reichard says that the hemorrhage will then cease and the parts adhere, and although lobelia may not be a germicide, it will so entirely close up a wound as to render it perfectly aseptic.—*South Med. Record.*

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MAY, 1886.

PHARMACEUTICAL NOTES.

(Contributed by the School of Pharmacy of Purdue University.)

INTRODUCTION.—Contributions for the advancement of science may be expected from an institution engaged in purely scientific instruction; and a school devoted to pharmaceutical education should likewise do what is possible to advance the interests of the profession by investigating the character of the drugs supplied in trade, the processes best adapted for their preparation, and the methods of testing their genuineness and purity. Pharmaceutical students should learn their own responsibility for the advancement of their chosen profession, and should be taught how to conduct such investigations as may be within their reach. Articles not otherwise credited are by the undersigned.

The following notes represent an effort to do what we could. As far as practicable the work of students has been credited to their several names; but the theses have been freely condensed by the compiler. The seven members of our first graduating class are all represented by name, while the work of juniors also will be found under "Potassii Bitartras."

Some remarks upon the standard of purity prescribed for "Potassii Nitras" will apply to many other salts.

Hoping to continue this work from year to year, the Faculty will gladly receive suggestions from any persons interested in pharmacy upon such topics as may need investigation.

ROBT. B. WARDER.

School of Pharmacy, Lafayette, Ind., April, 1886.

I. ACIDUM OLEICUM.—BY L. H. SCHULMEYER.

Four samples were examined. Nos. 1–3 were from different makers. No. 4 was prepared in our own laboratory by precipitating

the sodium salt with lead acetate, washing the precipitate, dissolving in benzine, decomposing with hydrochloric acid, washing to remove lead, etc., and warming in water-bath to remove benzine.

Ten gm. of each sample were dissolved in twice the volume of alcohol, and titrated with normal solution of caustic soda, using phenol-phthalein as indicator. Theory requires 35·4 c.c. Solution in alcohol gave no indication of fixed oils, but the samples were not free from palmitic acid, especially No. 3, which still had the odor of lard oil. Numerical results are given below.

	Specific gravity.	Vol. of normal NaOH required.	Percentage of oleic acid.
No. 1.	·91	31·8 c.c.	87
No. 2.	·89	28·6 "	81
No. 3.	·88	22·4 "	63
No. 4.	·90	35·1 "	99

II. Acidum Sulphurosum.—by John Kennedy.

Preparation.—The method of the Pharmacopœia gave unsatisfactory results, as sulphuric acid was found in excess in the product, while the sulphurous acid was deficient. Much better results were obtained by reducing with copper. When the gas was passed upwards through a cylinder filled with lumps of moist charcoal, and then through a wash bottle, the solution obtained was free from sulphuric acid; and by surrounding the receiver with snow, the strength was easily brought to 12 per cent. The cost of the copper cannot be considered an objection, for one pound of the metal (costing 30 cents) will theoretically yield nearly four pounds of blue vitriol, worth ten to twelve cents per pound.

Examination of Commercial Samples.—Specimens procured from druggists gave the following results:—

	Specific Gravity.	Per cent. of SO_2.	Per cent. of H_2SO_4.
No. 1.	1·008	1·68	Varying amounts.
No. 2.	1·028	3·28	
No. 3.	1·036	3·25	
No. 4.	1·003	None.	0·54
No. 5.	1·006	None.	0·91
No. 6.	1·023	None.	2·67

Even if accurate tests cannot be made, a pharmacist should always note whether his preparation has a strong odor of SO_2 before dispensing it.

Volumetric Estimation.—After making the tests noted above, an effort was made to find a ready method of titrating sulphuric in presence of sulphurous acid. A sample of sulphurous acid free from sulphuric was titrated both with caustic soda and with iodine; but the former result was too high. This discrepancy was probably due to dissolved carbonic acid, which could not be expelled by heat without loss of sulphurous acid also. It then remained either to oxidize the sulphurous acid first with decinormal solution of iodine in presence of starch and titrate with decinormal soda (deducting for both sulphuric and hydriodic acids formed) to determine the sulphuric acid, or to expel the sulphurous with any carbonic acid by heat before adding the alkali. In the first case, the two acids were determined in one portion, the iodide of starch being nearly decolorized with heat before adding the soda; by the latter method separate portions were required, and at a temperature of 70° C. several hours were required to expel all the sulphurous acid.

To test these methods, solutions of sulphuric and sulphurous acids were titrated separately, and measured quantities were then mixed to be titrated together.

25 c.c. H_2SO_4 required 25·6 c.c. decinormal HNaO, either in presence or absence of iodide of starch; hence, this volume contained 0·125 gm. H_2SO_4.

25 c.c. SO_2 required 8·4 c.c. decinormal solution of iodine; hence, this volume contained 0·027 gm. SO_2.

Measured quantities were then mixed and both constituents determined in the same portion as follows:—

	H_2SO_4.		SO_2.	
	Taken.	Found.	Taken.	Found.
No. 1	·125	·125	·027	·027
No. 2	·250	·254	·027	·027
No. 3	·125	·129	·054	·054

Mixtures were also prepared, and the H_2SO_4 determined after expulsion of SO_2 by heat, as follows:—

	H_2SO_4.		SO_2.	
	Taken.	Found.	Taken.	Found.
No. 4	·125	·125	·027	·027
No. 5	·250	·250	·027	·027

These results are considered satisfactory; but after developing

these methods the time was too short to procure and test other commercial samples.

III. Antimonii et Potassii Tartras.—by E. G. Eberhardt.

Five commercial samples, and one of my own preparation (No. 6), were examined with the following results. With the exception of No. 2, which was dirty, all were soluble in the prescribed quantity of water, showing the absence of cream of tartar or oxide of antimony. Nitrate of silver gave no reaction for chlorides, and ferrocyanides of potassium showed the absence of iron, etc. Special care was taken in the application of Fleitmann's test for arsenic:

	$BaCl_2$.	Am_2Ox.	Fleitmann's Test.
No. 1	Slight opalescence.	None.	Trace.
No. 2	None.	Trace.	"
No. 3	"	"	"
No. 4	"	"	"
No. 5	Slight turbidity.	"	Considerable.
No. 6	None.	None.	Slight trace.

We notice that all contain arsenic, but in my opinion only No. 5 contained objectionable amounts. For the preparation of No. 6, sulphide of antimony, containing only traces of arsenic, was boiled with hydrochloric acid as usual, filtered, boiled to expel sulphuretted hydrogen, and then poured into water with constant stirring. Only a small amount of the arsenic present in the sulphide is dissolved and re-precipitated. The oxide, after washing with water, was treated with ammonia (which would tend to remove the arsenic still further) before it was dissolved with bitartrate of potassium; but the pharmacopœial test is so delicate that 0·0001 per cent. of arsenious sulphide gives a distinct reaction, while 0·01 per cent. makes a decided black spot. So rigid a test for tartar emetic seems needless; for the far less delicate test (by precipitation of silver arsenate) is prescribed in the Pharmacopœia for purified sulphide of antimony, thus allowing considerable traces of arsenic to escape detection and be incorporated with antimony pills.[1] This subject is further discussed in the next article.

[1] In my own tests of tartar emetic (*Proceedings A. P. A. for* 1885, p. 480), the paper moistened with solution of silver nitrate was exposed for a few moments only to the escaping gas, and arsenic was not observed. No doubt the test is usually applied with less care than Mr. Eberhardt has taken. R. B. W.

Attempts were made to titrate tartar emetic with caustic soda, the oxide of antimony being precipitated. When litmus was used as indicator, the results were too low. With phenol-phthalein, four titrations gave results varying from 100·6 per cent. to 100·9 per cent. As the end of the reaction is somewhat difficult to distinguish, alkali was added to a decided red color. 1 c. c. normal NaOH represents 0·332 gm. of tartar emetic. This method cannot be recommended, unless for special cases, as to indicate the amount of gross adulteration. Such a case is reported by A. H. Jackson [see *Druggists' Circular* xxix, 233 (Nov. 1885)], who found 40 to 70 per cent. of sulphate of potassium in tartar emetic designed for manufacturing purposes.

IV. Antimonii Sulphidum and Antimonium Sulphuratum. —by E. G. Eberhardt.

Of five samples procured in Lafayette, Ind., only one was found to be genuine; the rest did not yield a trace of antimony, but seemed to consist of magnesian limestone mixed with coal dust.[1]

"Purified sulphide of antimony" is prepared by macerating five days with ammonia. Hager recommends the use of carbonate of ammonia, to avoid loss of antimony; but the amount of antimony dissolved with the arsenic by water of ammonia is too slight to tinge the yellow color of the sulphide of arsenic, when the latter is re-precipitated from the ammoniacal filtrate by acid.

Sulphurated antimony is prepared from the purified sulphide by dissolving in caustic soda and precipitating by dilute sulphuric acid. A sample was precipitated from a very concentrated solution, of very dark brown color and with brisk effervescence. A second sample was precipitated after diluting the alkaline solution; this was much lighter, and little sulphuretted hydrogen escaped during precipitation. The former doubtless had the larger percentage of oxide, and the darker color must be attributed to its denser condition. To avoid these variations, certain uniform conditions, as those prescribed in the Pharmacopœia, should be strictly observed.

The only use of purified sulphide of antimony mentioned in the

[1] Eight samples of black antimony from various towns in Ohio, Indiana, Illinois and Michigan, all proved to be spurious, as described above; while five samples from New York, Philadelphia and Boston were genuine. Details will be found in *Proceedings A. P. A.* for 1885, p. 479. R. B. W.

Pharmacopœia is the preparation of sulphurated antimony. The former, it seems, might readily be discarded, and the latter might be made more directly by treating the native sulphide in hydrochloric acid, and precipitating with sulphuretted hydrogen. By this process the prolonged maceration with ammonia can be omitted, and a nearly definite chemical substance results. The most apparent objection is the possibility of dissolving arsenic in hydrochloric acid, and this danger was subjected to careful examination. A sample of ordinary sulphide was purified by the pharmacopœial process; another portion was dissolved in hydrochloric acid and re-precipitated by sulphuretted hydrogen. Both products met all the requirements for "purified sulphide," though both contained arsenic, as shown by Fleitmann's test. The comparative experiments were repeated upon a mixture of sulphide of antimony with about 5 per cent. sulphide of arsenic. Both products gave about equally strong reactions with Fleitmann's test. The process was repeated with these products, and the reactions were again about equal but very slight. Judging by comparative tests, they contained less than 0·01 per cent. of arsenious sulphide. This would seem to indicate that arsenic is eliminated by precipitation as readily as by maceration with ammonia in the manner prescribed.[1] In applying the proposed method to the manufacture of sulphurated antimony, some expense may be saved by passing the sulphuretted hydrogen from a portion of fresh ore into the acid solution of another portion.

The question also arises whether the traces of arsenic allowed are deleterious. Sulphurated antimony is alterative and emetic; alterative in small doses, and this effect would be increased by a small quantity of arsenic; and even the larger emetic doses would not contain a dangerous quantity of arsenic; for any harm from the latter would be obviated by the emetic effect of the antimony.

[1] Further experiments are desirable to determine the conditions for obtaining the best results; but there can be little doubt that arsenic will dissolve most slowly during the first part of the operation, while sulphuretted hydrogen is given off copiously. Lang has investigated the condition of equilibrium for the solution and precipitation of sulphide of antimony [*Ber. d Chem. Gesel*, xviii, 2714–2724 (Oct. 1885)]; and the fundamental principles of "action of mass" are likely to find more general recognition in the future, as applied to both manufacturing and analytical operations. R. B. W.

V. Calx Sulphurata.—by M. Jay.

The Pharmacopœia specifies that this preparation shall contain at least 36 per cent. of CaS, but the directions for testing with sulphate of copper are very misleading. Lime itself precipitates copper from its solution; hence, dilute acid should be added with the pharmacopœial test, in order to dissolve any copper not precipitated as sulphide. Even then, we only learn whether or not the sample contains less than the required percentage, while a little additional trouble ensures results by which different samples can be accurately compared.

Tests were made of several published *volumetric methods for estimating sulphides*, depending upon—

1. Complete precipitation by solution of zinc.
2. Reduction of ferric to ferrous sulphate, and titration with permanganate.
3. Partial precipitation of an arsenite as As_2S_3, and titration of residual arsenic.

Decinormal solutions were prepared containing—

Sulphate of zinc dissolved in excess of ammonia (14.345 gm. $ZnSO_4.7\ H_2O$ to the liter);

Permanganate of Potassium (adjusted to be equivalent to decinormal oxalic acid);

Iodine; and

Hydrochloric acid.

Other solutions used were—

Dilute sulphide of ammonium, freshly made, of which 20 c. c. were used for each titration;

Alkaline solution of arsenious acid, of about 1 per cent.; and

Bicarbonate of soda of known strength.

1. Sulphate of zinc was cautiously added from a burette to 20 c. c. of sulphide of ammonium. A drop of the mixture was placed upon filter paper from time to time, close to a spot moistened with test solution of acetate of lead; and when no dark stain was at once produced by contact of the fluids, the reaction was considered complete. A stain was noticed after drying some minutes, even when the zinc was in excess. As the mean of two concordant titrations, 14.85 c. c. of decinormal zinc solution were required for complete decomposition of the sulphide.

2. A mixture of 20 c. c. of sulphide, with excess of ferric sulphate and dilute sulphuric acid was digested half an hour, and then titrated with permanganate, requiring 14·73 c. c. to give a rose tint.

3. Ten c. c. of solution of arsenic were mixed with 20 c. c. of the sulphide, and acidified by the addition of 45 c. c. decinormal solution of hydrochloric acid. The whole mixture was diluted to 250 c. c. and filtered. 100 c. c. (or two-fifths) of the filtrate were made alkaline by the requisite quantity of solution of bicarbonate of soda, and 4·8 c. c. of solution of iodine were then required to oxidize the arsenious acid still present; the whole filtrate would therefore have required $\frac{5}{2} \times 4{\cdot}8 = 12{\cdot}0$ c. c. of iodine; while 10 c. c. of the original arsenic solution required 21.5 c. c. iodine; hence the arsenic precipitated as sulphide would have required $21{\cdot}5 - 12{\cdot}0 = 9{\cdot}5$ c. c. of decinormal iodine. In thus comparing a sulphide with iodine, we must refer to the equations,

$$4\,I + 2\,H_2O + As_2O_3 = 4\,H_2O + As_2O_5, \text{ and}$$
$$6\,HCl + 3\,Am_2S + As_2O_3 = 6\,AmCl + As_2S_3 + 3\,H_2O;$$

it is readily seen that the same quantity of arsenic that requires four times the atomic weight of iodine, would require three times the molecular weight of a sulphide; and the atomic weight of the former represents three-fourths times the molecular weight of the latter. But since sulphur has a combining power of two, we take half the molecular weight for a normal solution of a sulphide, and the atom of iodine represents three-half times this amount. Hence, 9·5 c. c. of decinormal solution of iodine (which represents the arsenic precipitated by the sulphide) would represent $\frac{3}{2} \times 9{\cdot}5 = 14{\cdot}25$ c. c. of a decinormal solution of sulphide.

The results of the three methods of titration may now be compared; the amount of sulphide present in 20 c. c. of the solution used, when compared with decinormal solution, was found equivalent to—

14·85 c. c. by titration with zinc.
14·73 " " " permanganate.
14·25 " " " iodine.

This agreement is considered satisfactory, and the first method was adopted for further use. 1 c. c. decinormal solution of zinc represents 0·0036 gm. CaS; but this salt was treated with ammonia before making the titration.

0·36 gm. of a *commercial sample* (presented by the Mallinckrodt

Chemical Works) required 43 c.c. of the zinc solution, and, therefore, contained 43 per cent. of sulphide.

The following experiments in the *preparation* of calcium sulphide were interrupted by the close of the term. Two specimens were prepared (as directed in the Pharmacopœia) by mixing 90 gm. of sulphur with 100 gm. of lime, and heating to low redness in a crucible with the lid luted on. 0.36 gm. of each product, after treatment with ammonia, required 16 and 18 c.c. standard zinc solution respectively, indicating 16 and 18 per cent. of CaS. The lime was not perfectly fresh and it is probable that sulphur escaped with moisture or carbonic acid; yet the product satisfied the test as described in the Pharmacopœia.

An attempt was then made to reduce sulphate of calcium by igniting two hours at a low red heat in a current of coal gas. The product was darkened by the separation of carbon, and contained 26 per cent. of sulphide.

A fourth preparation was made in like manner, substituting hydrogen for coal gas to avoid the deposit of carbon. After two hours' ignition, this contained less than 0·2 per cent. of sulphide; after three hours further ignition in hydrogen, it contained only 2 per cent. CaS.

Unfortunately, there was no time for further experiments with various reducing agents and temperatures;[1] and these experiments are recorded to indicate further lines of investigation.

VI. Chloral.—by B. D. Westenfelder.

Four samples of commercial chloral hydrate were examined. Besides several tests prescribed in the Pharmacopœia, one gram of each was decomposed by caustic soda, the excess of alkali being after-

[1] T. S. Dymond prepared a sample of light pink color, containing 58 per cent. CaS, by igniting 7 parts of sulphate of calcium with 1 part of powdered wood charcoal, as directed in the British Pharmacopœia. See *American Druggist*, xiii, 208 (Nov. 1884). Should there be any reason to suppose that the medicinal value is due to any other ingredient than the monosulphide (as the editor of the *American Druggist* believes), this fact must be duly considered. Preliminary experiments were made by Mr. Jay upon specimens of ammonium sulphide which had undergone changes with age, and probably contained some thiosulphate as well as polysulphides. With such a mixture the three volumetric methods gave widely discordant results; but a combination of all may be useful in distinguishing the several ingredients of sulphuretted compounds. R. B. W.

wards determined volumetrically by one-fifth normal oxalic acid. The results are as follows:—

	Boiling point.	Solidifying point.	Per cent. chloral hydrate found by titration.	Reaction with nitrate of silver.
No. 1..... Neutral.	98° C.	49·8°	100·0	Clear.
No. 2..... Acid.	98°	48°	98·5	Distinct opalescence.
No. 3..... Slightly acid.	98°	48°	98·0	Clear.
No. 4..... Acid.	97°	48°	99·3	Distinct opalescence.

All were completely volatilized when heated on platinum foil, were free from blackening when warmed with sulphuric acid, and yielded no iodoform in testing for alcoholate.

Nos. 1 and 3, in saccharoid masses, were more readily soluble in water than No. 2, which was in crystals.

Numerous experiments convince me that chloral hydrate is compatible with alcohol in presence of bromides of potassium, sodium or ammonium. The following mixture gave no precipitate:—

Potassii bromidum,	
Chloral hydrate.....aa.....	gr. 90
Alcohol (94 per cent.).....	ʒii.
Aqua.....	ʒiv.

VII. Cimicifuga.

Some doubt having been expressed in regard to the crystallizable principle announced by Conard in 1871, his process was carefully followed; and though several pounds of the well-preserved drug were used, no crystals could be obtained. The result was confirmed by Prof. Coblentz in his examination of cimicifugin. See Lloyd's *Drugs and Medicines of North America.*

VIII. Glycerinum.

Twenty samples were tested and conformed very nearly to the requirements of the Pharmacopœia, though a very slight excess of moisture is indicated in several instances. One sample had a disagreeable odor; one also had some color, and gave distinct reaction with silver nitrate within half an hour. The manufacturers maintain a high standard of excellence, and retailers, so far as observed, do not adulterate the goods in their stores. The full paper, describing in detail the methods of examination adopted and the character of the several samples, will be found in *Proceedings A. P. A.* for 1885, p. 486, and in *American Druggist* for October, 1885.

(*To be concluded in the June number*).

LABORATORY NOTES.

By A. H. Cohn, Ph.G.

(Read at the Pharmaceutical Meeting, April 20th.)

Hydrargyri Iodidum Viride.—Having an opportunity to prepare mercurous iodide according to the method of the Pharmacopœia, several specimens were purchased from retail pharmacists and tested for mercuric iodide.

Three samples were examined, and all were contaminated, more or less, with mercuric iodide. The following test was applied to detect the mercuric salt.

A definite quantity of the powder was shaken with alcohol. The filtrate was evaporated upon a watch crystal between 70° and 80° C.

Specimen 1 contained ·5 per cent. of mercuric iodide.
" 2 " ·3 " " " "
" 3 " ·2 " " " "

The specimen prepared by myself according to the Pharmacopœia contained no mercuric salt. No doubt most mercurous iodide sold in retail stores has been kept for some time, and consequently the mercurous iodide is changed into the mercuric, as in some places I noticed it not protected from the light.

Magnesii Citras Granulatus.—Of this preparation three specimens of different manufacture were obtained, and all were found to be contaminated, more or less, with tartaric acid. The following are some of the tests given by the Pharmacopœia:

1. On addition of ammonium chloride to the aqueous solution of the salt, a portion of the liquid, when mixed with excess of solution of ammonium phosphate and water of ammonia, should produce a white crystalline precipitate, soluble in acids.

2. On mixing another portion with test solution of chloride of calcium, supersaturated with water of ammonia and filtering, the filtrate deposits a white precipitate on boiling.

3. The saturated aqueous solution of the salt, when mixed with a saturated solution of potassium acetate and some acetic acid, should not yield a white crystalline precipitate (abs. of tartrate).

The first test was answered by all the specimens. None of the specimens answered the second and third tests. The third test given proved that there was tartaric acid in all of them.

A quantitative test was made, according to test three (3), with the following results:

No. 1 contained 9.77 per cent. of tartaric acid.
" 2 " 19.42 " " " "
" 3 " 31.5 " " " "

The acid tartrate of potassium, formed on mixing the saturated solutions of potassium acetate and the magnesium citrate, was tested for tartaric acid in the following manner: The bitartrate of potassium was neutralized with sodium hydrate, forming the soluble sodium and potassium tartrate; then silver nitrate was added, forming silver tartrate. To this precipitate one drop of ammonium hydrate was added to redissolve the silver tartrate, and the solution was heated slowly, upon which the silver mirror was formed on the sides of the test tube.

Potassium was tested for in two of the specimens, but with negative results.

A test was also made for sulphuric acid, and the three samples gave the precipitate with barium chloride.

The amount of sulphuric acid was estimated in numbers "one" and "two," with the following results:—

No. 1 contained 7·07 per cent. of sulphuric acid.
No. 2 " .699 " " " "
No. 3 " a small trace.

Another sample of the salt was prepared by the writer according to the Pharmacopœia, with a fair result, and answered all the tests required by the U. S. P.

Diastase.—By E Bourquelot (*J. Pharm.* [5], xi, 367–372).—Diastase is widely distributed in nature, both in animals and plants. Most physiologists admit that malt diastase and that of human saliva determine the saccharification of starch, of glycogen, and of certain dextrins; but some maintain that these compounds possess other properties. The author, however, shows that the inversion of cane-sugar ascribed to the action of saliva diastase is really due to the invertin secreted by microphytes present in the saliva; the same action caused by malt diastase is due to invertin secreted by fungoid growths which can be found on the malt grains. The author maintains that all the diastases considered are identical.—*Jour. Chem. Soc.*, 1885, p. 927.

BISMUTH CITRATE.

By R. Rother.

The profession of pharmacy doubtless accept it as a fundamental fact of their vocation that pharmacy is not chemistry, although practical chemistry may be the root of it. Now even the scientific part of pharmacy is utterly concrete. But chemistry itself is only an abstract-concrete science, and, therefore, essentially distinct from mathematics which is an abstract science *par excellence*. An abstract science pure and simple deals only with space and time relations, whereas concrete science treats of the relations among things. In abstract science theory and fact are identical. But in concrete science both theory and fact are only approximate. It therefore seems like a slight comprehension of the meanings of words to affirm in all seriousness that pharmacy should be as exact a science as mathematics. When balances and manipulative skill can readily apportion not merely up to the molecule, but to the restless atom, will be the proper time to look into the mathematical accuracy of pharmacy.

It is now also believed that there is a more prevalent activity in operative pharmacy than heretofore, and that the manifestation of such spirit is due to better chemical knowledge among the craft. There will always be some whose mental trend diverts their activities into peculiar channels, and as the whole aggregate augments, their numbers will also correspondingly increase. It can, however, be shown from *a priori* grounds that although the actual number may be greater their totality will be comparatively smaller. It is, however, questionable whether there is such a leaning towards the presumed accuracy. If, as is also thought, universal distress, or rather growing avarice, is the incentive to productive energy, it only shows that the rectifying factor is merely of secondary import. The aim appears to be not so much towards an ideal purity as the ready acquisition of the greatest amount of available product, that is real substance. General experience, however, goes to show that there is ultimately no gain in this particular field of operative pharmacy, and that its scope is incredibly restricted. In this connection the British apothecaries are at present considerably exercised over the shortcomings of their new Pharmacopœia, and incidentally the writer has been adversely criticized on his process for preparing bismuth citrate. At the very outset the writer had observed in connection with this process that a considerable opacity resulted when the bismuth citrate thus prepared is treated with

ammonia. The writer credited this turbidity to the presence of bismuthyl chloride, with which the commercial nitrate is known to be contaminated. On a later occasion it was thought desirable to ascertain its relative amount and incidentally its identity. Hence 200 grains of the citrate was mixed with some water and treated with ammonia in excess. The mixture was set aside and when the turbidity had firmly subsided the clear liquor was decanted. The residue was repeatedly washed and finally dried. It was found to weigh 2½ grains. Consequently it amounted to one and a quarter per cent. The dry substance had a dingy white appearance. When heated in a dry test tube it evolved some water but no very distinctive odor. The residue on further heating to redness at first turned brown and finally became light yellow. The unheated body did not dissolve in dilute nitric acid even on boiling, it however readily dissolved in cold strong nitric acid. When this solution was diluted with water and treated with ammonia the characteristic bismuth hydrate was precipitated. On treating the clear supernatant liquor with barium chloride and nitric acid a very distinct sulphuric acid reaction became evident. On adding argentic nitrate to the dilute nitric solution of the body an abundant white curdy precipitate formed. This on washing readily dissolved in ammonia water from which solution nitric acid promptly liberated it. On exposure to light the precipitate became deep purple tinted. These results showed that the insoluble residue is chiefly bismuthyl chloride contaminated with sulphate. The precipitation of bismuth hydrate from its nitric solution by means of ammonia shows the absence of citrate as also does the non-appearance of empyreuma on incineration. Its relatively small amount further shows the phenomenal purity of American subnitrate of bismuth.

It thus appears that the Scotch apothecary did not examine the bismuthyl citrate which he proclaimed with such confidence. His result is surely not an encouraging "outcome of better chemical knowledge."

In conclusion the writer will say without arrogating any importance to himself that the Revision Committee of the U. S. Pharmacopœia showed rare discretion in not permitting a slight impurity or prejudice to stand in their way of adopting a practical and efficient process.

Boric Acid in Offensive Urine.—An English physician says he has met with no case of offensive urine (intestinal-vesical fistula excepted) that ten or twenty grains of boric acid, given every three hours, would not cure. —*Canadian Practitioner.*

NANCE BARK.

By Ferdinand Holberg, Ph.G.

(Abstract from a Thesis.)

Being unable to ascertain the botanical origin of this bark,[1] I can only state that the tree yielding it is indigenous to Mexico, and that the bark is largely used in that country for tanning purposes. The following investigations were made in the chemical laboratory of the Philadelphia College of Pharmacy:

The bark is seen in pieces which are from 8 to 16 inches long and ¼ to ½ inch thick; externally it is grayish brown, warty, transversely wrinkled and deeply fissured, and has a thick, corky layer; internally it is brownish red, wrinkled and striate from prominent bast fibres; the transverse fracture is splintery, and the longitudinal fracture smooth.

The powdered bark lost on drying 12·4 per cent. of moisture, and yielded 6·8 per cent. of ash, of which 28·17 per cent. was soluble in water, 67·25 soluble in hydrochloric acid, leaving an insoluble residue of 4·58 per cent.

The result of the proximate analysis was as follows:

Extracted by petroleum spirit: crystalline principle	1 85
Extracted by ether: resin and crystalline principle	4·87
Extracted by alcohol: tannin, glucose, etc	28·26
Extracted by water: glucose, coloring matter, etc	3·15
Extracted by soda: albuminoids, etc	2·58
Extracted by hydrochloric acid: calcium oxalate	2·73
Cellulose (after treatment with chlorine)	34·48

The crystals obtained from petroleum spirit were feathery, white, soluble in absolute alcohol and strong ether, dissolved in sulphuric acid with a yellow color, melted at 176° C., and did not react with alkaloidal reagents. The ether extract was mostly soluble in water, the insoluble portion dissolving in alkalies with a dark red-brown color. Alkaloids could not be detected, but the aqueous solution rendered alkaline yielded to petroleum spirit a crystalline principle which was readily soluble in water, was not affected by alkaloidal reagents, and did not reduce Fehling's solution.

[1] In a list of plants published in Dondé's Botanica, Náncenes is stated to be a Malpighia, probably M. glabra, *Lin.* The malpighiaceæ are confined to tropical regions and are mostly strongly astringent, their barks, and in some cases also the wood, being frequently adapted for tanning.—Editor.

The tannin was estimated by boiling 15 gm. of the powdered bark with water, precipitating the filtrate with gelatin and washing and drying the precipitate; it weighed 3·929 gm., showing the presence in the bark of 26·2 per cent. of tannin.

NOTE ON THE REACTIONS OF COCAINE SALTS WITH POTASSIUM PERMANGANATE.

By A. B. Lyons, M. D.

Potassium permanganate has been recently proposed as a test for the purity of commercial cocaine salts. [F. Giesel, in *Pharm. Zeitung*, No. 16, 1886]. If to a strong solution of pure cocaine hydrochlorate there is added decinormal solution of potassium permanganate, there is produced a precipitate of a deep, violet-purple color, consisting of a permanganate of the alkaloid. The salt is very unstable, and if left to itself decomposes spontaneously in a few hours, leaving behind a deposit of the dark brown hydrated peroxide of manganese.

If examined with a microscope when first thrown down, the precipitate will be found to consist, wholly or in part, according to the strength of the cocaine solution, of translucent violet-red crystals, of great beauty. These assume the form of rhombic (nearly rectangular) plates, of which several are frequently grouped in a rosette-like arrangement. A solution containing 5 per cent. of cocaine hydrochlorate yields at once a copious deposit of crystals. Solutions containing 2 per cent. of the salt gave crystals after a short time. When the proportion of cocaine was reduced to 1 per cent., crystals formed only as evaporation took place, and a solution of one-half this strength yielded only a few crystals. In all cases there appeared simultaneously with the crystals amorphous floccules of the manganic hydrate, and the crystals would shortly disappear, leaving behind the same unsightly residue.

If the solution containing the deposit is heated to boiling, the same change takes place at once, but the decomposition of the salt is not attended with the evolution of any peculiar odor.

The behavior of impure products will vary, naturally, with the nature of the impurity. The amorphous cocaine hydrochlorate, which is now, however, not often met with, generally manifests its impurity by an immediate reduction, in the cold, of the permanganate solution. The first drop or two of the reagent produces a brown discoloration

in the fluid, and the precipitate thrown down by an excess is more or less brown, instead of being of a distinct violet purple or red.

On heating the mixture cautiously, there is developed also in solutions of these impure products an odor in some cases resembling that of the oil of bitter almonds, in others like that of crude cocaine. The development of this foreign odor is interfered with, at least in some cases, by an excess of the reagent.

Pure cocaine salts, I believe, are now abundant in the market, but occasionally we meet with products reasonably white and free from any apparent admixture, which are nevertheless very impure. The hydrochlorate is now generally offered in the form of hydrate crystals, and these, when white, well formed and dry, are presumably pure, although they are rarely quite free from odor.

The characters which a pure salt hydrochlorate of cocaine should possess may be stated as follows:

It should be nearly or quite odorless; especially it should not have an acid odor, or one resembling benzoic acid. The reaction should not be strongly acid to litmus. The salt should dissolve in sulphomolybdic acid without producing any transient brown coloration, or any immediate coloration whatever. It should dissolve also in sulphuric acid to a colorless solution. A 2-per-cent. solution of the salt should not become brown on addition of a drop or two of decinormal solution of potassium permanganate, neither should the solution develop any strong foreign odor on heating after the addition of a larger quantity of the permanganate. The precipitate produced in stronger solutions by permanganate must be of a clear, violet-purple or red color, and must consist, at least in part, of distinct rhombic crystals of cocaine permanganate.

April 21, 1886.

NOTE ON COCAINE AND ATROPINE.

By Professor Flückiger.

In my paper, *Pharmaceutical Journal* of January 16, p. 602 (see Am. Jour. Phar., March, p. 129), mentioned briefly that cocaine produces a white precipitate in mercuric chloride, turning red after a few hours, and that the said alkaloid is unable to redden phenolphtalein paper. Having recently been presented with excellent specimens of cocaine by my friend, Dr. Squibb, of Brooklyn, I applied the above

tests to them. One of the samples consisted of the crude alkaloid made in South America, which, it is true, contains 43 per cent. of matter insoluble in ether. This impure cocaine immediately developed the red coloration on moist phenolphtalein paper; not so the other specimen of cocaine carefully prepared in Dr. Squibb's laboratory.

Cocaine is not very stable; it is a well-known fact that solutions of that alkaloid or of its salts do not keep for a long time without decomposition. If the purest cocaine be dissolved in water and evaporated, the residue, after having repeatedly undergone this treatment, will no longer display an alkaloid reaction on litmus paper, but it then slightly *reddens litmus.*[1] This experiment proves that *cocaine already splits up by the mere influence of boiling water.* I demonstrated this much more strikingly by enclosing a little cocaine with, say, about five times its weight of water, and heating it for a week in a closed tube, only in a temperature of scarcely 100° (212° F.). When the tube was opened, the liquid showed now a *very strongly acid reaction.* The alkaloid must have been decomposed, in all probability into benzoic acid and ecgonine. I do not know whether the latter, in the free state, has any action on litmus, but from my experiment it would appear very probable that it has not; at least, the acid reaction of the acid (benzoic, no doubt) produced under the above-mentioned conditions is not altered by the presence of the other product of decomposition—ecgonine probably.

I thought it worth while to examine *atropine* in the same way. This alkaloid, as I have shown in my paper in the *Pharmaceutical Journal,* January 16, 1886, p. 602 (see Am. Jour. Phar., 1886, p. 129), displays a very decided alkaline reaction, both with regard to litmus *and phenolphtalein.* This was no longer the case when I heated the atropine in a closed tube with water for a week. The solution, however, did not redden litmus, but, on the other hand, it no longer displayed an alkaline reaction, neither on red litmus paper nor on phenolphtalein. The said aqueous solution of atropine, moreover, produced no precipitate at all in the solution of mercuric chloride (see my paper just alluded to). It is evident, therefore, that *atropine, as well as cocaine, is decomposed merely* by the prolonged influence of water at a temperature of nearly 100° C.

The reactions which I mentioned may prove very interesting theoret-

[1] See Notes on Cocaine, etc., by Dr. Paul, *Phar. Jour.*, xvi., (Oct. 17, 1885), p. 325.

ically, but the practitioner will object that they are of little use to him. There is another test for cocaine, which will be found in the *Pharmaceutische Zeitung* of Berlin, February 27, 1886, p. 132. Dr. Giesel states that 1 centigramme of hydrochloride of cocaine dissolved in 2 drops of water is precipitated by a solution of potassium permanganate (1 in 330), a violet insoluble salt of the alkaloid being produced. I find that statement quite correct; sometimes very fine microscopic crystals of the salt make their appearance. Having tried, on the other hand, morphine, strychnine, and quinine, I ascertained that they cause simply the permanganate to be reduced without yielding an alkaloidal permanganate. Dr. Giesel's fine test is therefore very characteristic for cocaine.

If cocaine or its salts are heated with sulphuric acid (1·84 sp. gr.) an abundance of white acrid vapors are given off; on cooling they deposit crystals of benzoic acid on the walls of the tube. This reaction may also be performed with a minute quantity of the alkaloid.

I cannot speak so favorably with regard to another test, which has recently been recommended by Dr. Lenz, in the *Zeitschrift für analytische Chemie* of Fresenius, xxv. (1886), p. 31. On melting cocaine with caustic potash, Dr. Lenz noticed a yellow or brownish coloration. It seemed to me that this reaction is not very characteristic, inasmuch as many other substances can afford a similar hue when treated in the same way.—*Phar. Jour. and Trans.*, March 20, 1886, p. 800.

THE PRESENCE OF CINCHONIDINE IN THE QUININE SULPHATE OF COMMERCE.

By A. J. Cownley.

The statement lately made by Dr. de Vrij, that all the quinine sulphate of commerce contains more than 5 per cent. of cinchonidine sulphate, not being in accordance with the general experience of those conversant with the subject, it may not be inopportune to publish some results obtained in the examination of samples of commercial quinine sulphate in the course of the last ten years. The method of analysis by which they were obtained is sufficiently delicate to admit of the detection of one-thousandth part of cinchonidine sulphate (*Phar. Jour.* [3], vii, p. 654, see Am. Jour. Phar, 1877, p. 202.)

This publication is the more necessary from the fact that the author of the statement referred to has arrived at his conclusions from results

obtained in endeavoring to determine the amount of cinchonidine in commercial quinine sulphate by a certain optical method which is not accepted as giving accurate results.

The samples are referred to by numbers, and the following are the results obtained:—

Table A.

No.	Water of crystallization. Per cent.	Quinine sulphate. Per cent.	Cinchonidine sulphate. Per cent.
1	15·14	84·86	none
2	15·70	84·30	none
3	15 90	84·10	none
4	14·11	85·89	none
5	15·17	84·83	trace
6	13·49	86·51	none
7	11·70	88·30	none
8	not determined; salt fully crystalized.	——	0·39
9		——	0·61
10		——	4·60
11	13·86	84·64	1·50
12	16·12	83·88	none
13	14·70	82·90	2·40
14	12·00	88·00	trace
15	13·90	84·90	1·20
16	13·98	84·82	1·20
17	12·40	84·20	3·40
18	13·00	82·40	4·60
19	15·10	81·50	3·40
20	13·32	85·81	0·87
21	14·90	80·88	4·22
22	14·20	84·81	0·99
23	15·25	81·59	3·16
24	13·67	81·43	4·90
25	8·10	87·35	4·55
26	10·37	84·19	5·44
27	15·40	79·50	5·10
28	12·64	82·86	4·50

These results, therefore, do not bear out the statement that all the sulphate of quinine of commerce contains more than 5 per cent. of cinchonidine sulphate, for out of nearly thirty samples examined at different times, the average proportion of cinchonidine found only amounted to 2.04 per cent.

The circumstance that some samples of quinine sulphate of inferior quality contain an undue proportion of cinchonidine is now well known, and this fact was first pointed out by Dr. Paul some years ago (*Phar. Jour.* [3], vii, p. 672), when illustrating the defective char-

acter of the British Pharmacopœia test of the purity of this article. But there is no warrant for the assumption that all the sulphate of quinine of commerce is to be included in the same category.

The results of analysis of a few samples of such inferior kinds of quinine sulphate are shown in the following table:

Table B.

No.	Water of crystallization. Per cent.	Quinine sulphate Per cent.	Cinchonidine sulphate. Per cent.
29	15·04	79·04	5·92
30	15·51	76·98	7·51
31	15·40	77·60	7·00
32	15·05	76·97	7·98
33	13·80	78·05	8.15
34	15·03	78·03	6·94
35	15·28	78·24	6·48
36	15·60	75·40	9·00
37	14·63	79·57	5·80
38	11·40	74·70	13·90
39	14·98	76·37	8.65
40	15·95	77·39	6·66

The samples referred to in this latter table were in all probability liable to suspicion; but, with the exception of one, even these do not appear so bad, as regards the amount of cinchonidine sulphate, as Dr. de Vrij now represents the whole of the quinine sulphate of commerce to be, whether of English, German or French manufacture. It is, moreover, especially noteworthy, as regards Dr. de Vrij's results, that he has, in all instances, operated upon those brands of quinine sulphate which have the highest repute and have hitherto been found to contain but very little cinchonidine. It may therefore be inferred that Dr. de Vrij has been misled by the method he has adopted and by the speculative grounds upon which his conclusions are founded, so that the data given by him may in reality be regarded as mere exponents of a varying error of observation.—*Analytical Laboratory*, 13 *Fenchurch avenue, E. C.—Phar. Jour. and Trans.*, March 20, 1886, p. 797.

Boric Acid in Diabetes Mellitus.—F. A. Monckton (*Australasian Med. Gaz.*) reports he has cured one case of diabetes mellitus with this drug. The patient was not stringently dieted, but was given seven grains of the acid three times a day, and at the end of ten weeks the sugar had all disappeared from the urine, the specific gravity being reduced from 1025 to 1016. The drug produces no unpleasant effect.—*Cinc. Lancet*, March 6, 1886.

GLEANINGS FROM FOREIGN JOURNALS.

By Geo. H. Ochse, Ph.G.

Non-poisonous Substitute for Oxalic Acid.—Hager recommends a mixture of equal parts of partly desiccated alum and citric acid as a substitute for oxalic acid. The mixture must be reduced to a fine powder, and might be dispensed where oxalic acid is asked for and the dispenser has his doubts regarding the intention of the purchaser.—*Phar. Rundschau*, xii, p. 167.

Sulphanilic Acid in Iodism.—Ehrlich uses sulphanilic acid as a remedy for iodism. Where it is desirable to give iodine for some time, and the patient shows an inclination to iodism he gives it in doses of 3 or 4 gm.; as soon as the patient shows symptoms of iodism he gives 6 or 7 gm. at once. Sulphanilic acid is best dispensed in aqueous mixtures with bicarbonate of sodium, using 2 parts of the alkali with 3 parts of the acid.—*Phar. Rundschau*, xii, p. 167.

To Clarify Shellac Solutions mix with $\frac{1}{4}$ volume of benzin, allow to stand one hour, agitating occasionally. The mixture separates in two layers; the benzin layer is decanted and the shellac solution slightly warmed to free it from the odor of benzin. By treating the coarsely powdered shellac with ether before dissolving in alcohol, the operation is facilitated.—*Phar. Rundshau*, xii, p. 192.

Butter Coloring.—Orlean, better known as annatto extract, is prepared by digesting 2 parts of curcuma in 10 parts of olive oil, and filtering.—*Phar. Rundschau*, xii, p. 192.

Iodol Gauze.—Iodol gauze is prepared by saturating gauze in a solution of 1 part each of iodol, resin and glycerin in 10 parts of alcohol. Iodol is odorless and does not produce intoxication, and hence is preferable to iodoform.—*Phar. Rundschau*, xii, p. 205.

Salicylates.—According to Milone, *barium salicylate* $Ba(C_7H_5O_3)_2 + H_2O$ is prepared by treating a hot aqueous solution of salicylic acid with barium carbonate, and filtering while hot. *Calcium salicylate*, $Ca(C_7H_5O_3)_2 + 2\ H_2O$, is prepared in like manner from calcium carbonate. *Strontium salicylate*, $Sr(C_7H_5O_3)_2 + 2\ H_2O$ in the same way from strontium carbonate. *Magnesium salicylate* $Mg(C_7H_5O_3)_2 + 4\ H_2O$, is prepared by treating a hot solution of barium salicylate with magnesium sulphate, and quickly filtering the hot solution while evaporating. *Zinc salicylate*, $Zn(C_7H_5O_3)_2 + 2\ H_2O$ is prepared like the magnesium salicylate from zinc sulphate. *Cadmium salicylate*, $Cd(C_7H_5O_3)_2 +$

H_2O, in the same way as magnesium salicylate from Cadmium sulphate. *Manganesium salicylate*, $Mn(C_7H_5O_3)_2 + 2\ H_2O$ is prepared like barium salicylate, from magnesium carbonate.—*Phar. Rundschau*, xii, p. 213.

To filter large quantities of water, Coccone proposes to filter the water through a layer (about 25 or 35 c.m. thick) of a mixture of 1 part of oxide of iron and 2 parts of sand.—*Phar. Rundschau*, xii, p. 213.

To remove grease spots from fabrics, benzol-magnesia (prepared by rubbing calcined magnesia with benzol) is recommended. Old spots must be rubbed several times with the mixture before the spots disappear.—*Phar. Zeitschrift für Russland*, xxv, p. 123.

Tests for Lanolin.—Messrs. Benno Jaffé and Darmstaedter give the following tests for lanolin:—(1.) 2 or 3 grains of lanolin and 10 c.c. of a 30-per-cent. solution of caustic soda are put in a flask, and the mixture warmed; red litmus paper placed over the flask should not turn blue. A lanolin containing ammonia is to be condemned. (2.) If 10 grains of lanolin are heated in a porcelain capsule with 50 gm. of distilled water, the lanolin, when melted, floats on top of the water and remains as a clear sediment on congealing. Impure lanolin produces a spongy mass which does not become clear when treated in this way. (3.) The water used in the above reaction, when evaporated, should be free from glycerin. (4.) If lanolin is kneaded under water it takes up over 100 per cent. of water without becoming soapy to the touch, and when rubbed in a mortar, it does not slip off the pistil or spatula.—*Schweiz. Wochenschrift*, 1886, p. 88.

Cocaine Test.—Dr. F. Giesel states that the sulphuric acid test for cocaine is not always reliable, and proposes the following test. If 1 centigram of cocaine hydrochlorate is dissolved in 1 or 2 drops of water, and about 1 c.c. of a 3-per-cent. solution of potassium permanganate added, a violet precipitate is produced, at ordinary temperature, containing but a trace of manganesium binoxide, and when boiled no odor of bitter almonds is perceptible.—*Schweiz. Wochenschrift*, 1886, p. 88.

Cocaine Benzoate.—Bignon states that the benzoate of cocaine is preferable to the hydrochlorate; the anæsthesia produced by the benzoate is more durable, and when applied to wounds it is painless. 1 gm. of the crystallized benzoic acid is saturated by 3 gm. of cocaine. A solution of 1:20 can be prepared by saturation when wanted.—*Bulletin Commercial*, February, 1886–88.

Solution of Caffeine for Hypodermic Injection.—Owing to the in-

solubility of caffeine, pharmacists are sometimes perplexed when making a solution for hypodermic use. Tanret recommends the following:—R. Sodii benzoatis, 2·95; caffeini, 2·50; aquæ dest., 10 c.c. Mix the benzoate of sodium and caffeine in a mortar and add the water; filter. Benzoate of sodium is preferable to the salicylate. If any trace of iron is present, salicylate of sodium would form a rose-colored solution.—*Répertoire de Pharmacie,* March, 1886, p. 119.

Preparation of Guaranine.—Rochefontaine and Gusset give the following formula for making guaranine:—5 gm. of powdered guarana are mixed with 1 gm. of calcined magnesia, and the whole moistened with water; after twenty-four hours the mass is exhausted with 40 gm. of boiling chloroform, the chloroform distilled or evaporated and the residue treated with boiling water, filtered and evaporated over sulphuric acid. After several recrystallizations, colorless crystals of guaranin are obtained.[1] Yield = 4·5 per cent.—*Chemischtechnischer Central Anzeiger,* iv, p. 322.

Manufacture of Aluminium by Electrolysis.—A saturated solution of aluminium sulphate and a solution of sodium chloride, separated by means of a porous vessel, are acted on by a current from 6 or 7 Voltas and 4 Ampéres. The double chloride of sodium and aluminium formed is decomposed, the aluminium settling on the negative electrode. This method can be employed for aluminium plating and also for obtaining aluminium by a cheap process.—*Chemisch-technischer Central Anzeiger,* iv, p. 322.

THE DETERMINATION OF GLYCERIN.

By William Fox and J. A. Wanklyn.

During an investigation on the constitution of oils and fats, with which we are engaged, it became necessary to make a number of glycerin determinations, and as experiment proved the ordinary methods to be inaccurate, we worked out the method given below, and which is based on the fact that glycerin, oxidized with permanganate of potash in a strongly alkaline solution, gives oxalic acid according to the equation $C_3H_8O_3 + O_6 = C_2H_2O_4 + CO_2 + 3H_2O$.

The oxalate can be precipitated by a lime salt, and the amount of

[1] A much simpler process for the preparation of caffeine from guarana was recommended by Dr. F. V. Greene (1877) and by Mr. Feemster (1882), and consists in boiling the guarana with oxide of lead, adding a small quantity of basic lead acetate, and evaporating the filtrate.—*See* Am. Jour. Phar., 1877, p. 332, and 1882, p. 523.—*Editor.*

oxalic acid determined, and the equivalent quantity of glycerin calculated therefrom.

We carry the process out as follows:

The aqueous solution of glycerin (which should not contain more than 0·25 gm. $C_3H_8O_3$) is made strongly alkaline by adding 5·0 gms. of solid caustic potash; powdered permanganate of potash is then gradually added until the solution is of a permanent pink color; the solution is now kept at the boiling point for half an hour, and then the excess of $K_2Mn_2O_8$ decomposed with sulphurous acid, either in solution or the gas may be used. The solution, which should now be colorless, is filtered from the precipitated oxide of manganese, and made acid with acetic acid and boiled; a lime salt is added, and the resulting oxalate collected on a filter and thoroughly washed with boiling water. As the precipitate is not pure oxalate of lime, we determine the oxalic acid in the lime salt by titrating with standard $K_2Mn_2O_8$ in the usual way; with a moderate amount of care this process is very accurate; the difference in several experiments should be under a half per cent., and Messrs. Benedikt and Zigmondy, since we suggested the process, have obtained very satisfactory results, which they publish in the *Moniteur Scientifique Quesneville*, vol. xv., October, 1885.

In the saponification of fats in which it is proposed to estimate the glycerin, care should be taken to have the whole of the alcohol driven off, as dilute alcohol treated with alkaline permanganate gives oxalic acid. It may be mentioned that the acids of the acetic series do not oxidize to oxalic acid with alkaline permanganate, whilst those acids of the acrylic series do.—*Chem. News*, January 8, 1886, p. 15.

Laboratory, 4, Great Tower St., E. C., December 29, 1885.

Phenolphthalein as an Indicator.—By E. Léger (*J. Pharm.* [5], xi, 425–428).—The author has observed that certain organic alkaloïds have no action on phenolphthaleïn; thus the presence of morphine, quinine, etc., does not interfere with the titration of sulphuric acid, the same holds true with regard to hydrochloric and nitric acids. Cicutine and codeine are two organic bases which have been found to affect this indicator. The author details experiments and concludes that—(1.) It is possible to estimate an acid volumetrically as easily when combined with certain alkaloïds as when in the free state. (2.) This estimation may serve within certain limits to indicate the purity of a salt of the alkaloïd.—*Jour. Chem. Soc.*, 1885, p. 931.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Eriobotrya japonica, Lindley, s. Mespilus japonica, *Thunberg.* the loquat tree or Japanese medlar, has been perfectly naturalized in Brazil, where it grows quite luxuriantly. The yellow, pear-shaped fruit is of about the size of a plum, covered with a silky pubescence, contains two to five blackish-brown glossy seeds, and has a vinous odor and an agreeable sweetish-acidulous taste; by fermentation the fruit yields a vinous beverage. The bruised seeds, treated in the same manner as bitter almonds, yield a distilled water containing 0·05 per cent. hydrocyanic acid, and in appearance and odor closely resembling cherry laurel water, but having a peculiar bitter taste. The leaves of the loquat tree have been found of service in chronic diarrhœa.—*Rundschau Leitm.*, 1886, p. 224.

This species is cultivated, to some extent, in the United States.

Bassia latifolia, Roxburgh; Sapotaceæ. Mahwah flowers having been recommended as food for animals, Prof. Church (*Gardeners' Chronicle*, Jan. 16, 1886) has submitted them to an examination, which indicated in the air-dry flowers the presence of 52·8 per cent. of glucose, 3·2 per cent. sucrose, and only 2.2 per cent. of nitrogen. While thus deficient as a nitrogenous food, they seem to be adapted for the production of alcohol, and are said to be largely used in France for this purpose.

Opionin is present in small proportion in Smyrna opium, and is prepared by O. Hesse by treatment with cold milk of lime, acidulating the solution with acetic acid, concentrating, exhausting the brown mass which precipitates with ammonia, acidulating with acetic acid and crystallizing the precipitate from alcohol or ether. Opionin forms acicular crystals, melts at 227° C., is free from nitrogen, does not dissolve in water, but is soluble in alkalies. By boiling with milk of lime it is converted into an acid freely soluble in water and ether. On fusing opionin with potassa, *opionylic acid* is produced, which crystallizes from ether in thick prisms, is readily soluble in water, melts at 126° C., and in neutral solutions gives, with silver nitrate, an amorphous precipitate, becoming crystallized. Both acids, when in alkaline solutions, yield precipitates with lead acetate.—*Liebig's Annal.*, ccxxviii, p. 299.

Reaction for Codeine and Morphine.—A solution of 1 gm. ammonium selenite in 20 c.c. of sulphuric acid was found to give, with the

above alkaloids, a beautiful green color, which, on the absorption of moisture, changes to reddish brown. A similar but less distinct reaction is obtained with a solution of sodium selenate in sulphuric acid. A number of other alkaloids and glucosides were tested in the same manner, but did not give this reaction.—*Compt. rend.*, c., p. 1543.

Nicotiana persica, Lindley.—Mr. E. M. Holmes has published some notes on the Persian *tumbeki* or *teymbeki*, which consists of the leaves of the above species, and of which the Shiraz variety is the most esteemed, those of Kechan and Teheran being about one-half the value of the former. The species closely resemble N. Tabacum, but its leaves are acute rather than acuminate, and its corolla is club-shaped, has a spreading limb, and is white inside and greenish outside. Teymbeki is smoked in a special apparatus, a kind of water-pipe, called *narghileh* from its resemblance in shape to a cocoanut (narghil), the teymbeki being placed in a small reservoir on the top, and the vapor drawn through a tube which passes to the bottom of the water; it collects above the water and is then inhaled through a long tube.

E. E. Eastes and W. H. Ince have made a chemical examination of different varieties of this tobacco, and obtained the following results:

	Ispahan.	Hidjaz.	Kechan.	Shiraz.
Nicotine	5·4945	2·046	2·909	5·835
Saccharoid matter	2·64	2·85	5·58	3·555
Matter soluble in water	42·0	42·3	39·9	55·6
Insoluble in water	58·0	57·7	60·1	44·4
Ash	22·0	28·5	28·5	26·15

—*Phar. Jour. and Trans.*, Feb. 13, 1886, pp. 681–683.

Oil of Lemon has been examined by G. Bouchardat and J. Lafont, who found, besides a little cymene, several hydrocarbons $C_{10}H_{16}$, the most abundant of which is a citrene boiling near 178° C., having a rotatory power exceeding +105°, and yielding a solid, optically inactive dihydrochloride. Several terebenthenes present boil near 162° C., and yield monohydrochloride, differing in power of rotation. —*Compt. rend.*, ci, p. 383.

An adulteration of oil of lemon with oil of turpentine may be detected, according to G. Heppe, by slowly heating the oil in a dry test tube with a small piece of copper butyrate to about 170° C., taking care that the temperature does not exceed 180°. The copper salt will dissolve in pure lemon oil with a green color, while in the presence of oil of turpentine a yellow, turbid mixture is obtained, reddish-yellow cuprous oxide being separated. The test seems also to

be applicable for the oils of bergamot and orange peel.—*Archiv d.Phar.*, 1885, p. 349.

Poison of the Nettle.—The irritating poison contained in the hairs of different species is generally regarded to be formic acid in the free state. Prof. G. Haberlandt, of Gratz, in an essay presented to the Academy of Natural Sciences, at Vienna, February 4, 1886, has shown that the irritation is produced by a poison which is dissolved in the cell sap, and the behavior of which proves it to be related to the formless ferments, or enzymes.

Poisoning by Frangula Berries.—Dr. O. Peterson (*St. Petersb. Med. Wochenschr.*) reports the case of a lad who, after eating some berries of Rhamnus Frangula, was seized with vertigo, headache, convulsions, unconsciousness, dilatation of the pupil, rapid, feeble pulse, and faint respiration. The treatment consisted in cold washings, clysters and the administration of ether until consciousness returned, when the stomach was evacuated by emetics. The poisonous effects seem to be due to hydrocyanic acid contained in the seeds.

Rhamnus Purshiana.—A student of the California College of Pharmacy has obtained from this bark small orange-red crystals which, after purification from alcohol, were found by Prof. Wenzell to sublime at 230° C. They dissolve in sulphuric acid with a deep red color without showing a green tinge, and though resembling frangulin to some extent, do not appear to be identical with this compound; neither are they identical with emodin. The principle will be further examined by Prof. Wenzell.—*Phar. Rundschau*, N. Y., 1886, p. 79.

Ferment of Gums.—According to J. Wiesner, gum arabic as well as other vegetable gums and mucilages, such as flaxseed, and those tissues in which cellulose is transformed into gum, contain a diastatic ferment, which converts starch into dextrin and arabin or bassorin, but which does not decompose glucosides, does not convert proteïds into peptones and has no inverting action on sugar; its presence interferes with the conversion of starch into sugar by bacteria or by diastase. By long continued boiling the ferment is decomposed; when boiled with strong hydrochloric acid and orcin, a red color is produced, changing to violet with the production of a blue precipitate, which is soluble in alcohol.—*Monatsh. Chem.*, vi, p. 592–619.

Raffinose and Gossypose, according to C. Scheibler, are identical, have the formula $C_{18}H_{32}O_{16} + 5H_2O$, are dextrorotatory giving $[a]_D = 103.9$, and when inverted by sulphuric acid give identical results.

Raffinose seems to exist ready formed in beet root, and not to be generated on storing the root or during the refining process, as appears to be the view of Loiseau, its discoverer (1876). Gossypose was isolated by Böhm and Ritthausen from cotton-seed cake.—*Ber. Deutsch Chem. Ges.*, 1886, pp. 1779–1786.

Cochineal.—C. Liebermann found in *carmine* nitrogen, averaging 3.7 per cent., of which only about 0.25 per cent. is expelled as ammonia on boiling with diluted alkali, the balance being present as proteïds. The ash amounts to about 8 per cent. and was found to consist of SnO_2 0.67, Al_2O_3 43.09, CaO 44.85, MgO 1.02, Na_2O 3.23, K_2O 3.56 and P_2O_5 3.20. The coloring matter does not appear to be a glucoside. A commercial sample of carmine yielded on analysis: moisture 17, nitrogen compounds 20, ash 7, coloring matter 56 per cent., and traces of wax.

The white covering of silver-gray cochineal consists of a peculiar wax, which in the black cochineal has probably been melted through the use of a high temperature in killing the insect, after which it is partly left as a thin transparent coating. This wax is easily removed from the unbroken insect by boiling with benzol, when on cooling most of the wax will crystallize, and is obtained pure by repeated crystallization from benzol or glacial acetic acid. This *coccerin*, on long continued boiling with alcoholic solution of potassa, yields a white crystalline acid, *coccerylic acid*, which melts at about 92° C., and has probably the composition, $C_{31}H_{62}O_3$. The other decomposition product is cocceryl alcohol, which is also a white crystalline powder, but melts at about 104° C., and seems to have the formula, $C_{30}H_{62}O_2$.

After powdering cochineal, previously exhausted with boiling benzol, ether takes up myristin and a deep red-colored oil, which parts with its coloring matter readily on agitating its ethereal solution with water. The liquid oil amounts to between 4 and 6 per cent., and contains free fat acids. The myristin crystallizes from the liquid fat, and is obtained pure by re-crystallization from hot alcohol; it is present to the extent of from 1.5 to 2 per cent.

The total yield of wax and fats from a sample of silver gray cochineal was 12 per cent. In the unbroken state this variety yielded, from different examples, between 1 and 2 per cent. of coccerin, while black cochineal gave from 0·5 to 1 per cent., and in one case 1.5 per cent. of coccerin; but 4.2 per cent. was obtained from granilla.—*Ber. D. Chem. Ges.*, 1875, pp. 1969–1983.

OIL OF SANDAL WOOD.

By E. M. Holmes, F.L.S.,
Curator of the Museum of the Pharmaceutical Society.

In the early part of the present year my attention was directed to the subject of sandal wood by the fact that there appeared in the druggists' wholesale price lists an oil of sandal wood marked "W. I," and offered at about one-third of the price of the genuine oil. As the genus *Santalum* is not represented on the American continent it was evident that the "West Indian" oil must be obtained from some other plant. The results of inquiries made since then appear to me to possess sufficient interest to be placed on record in the columns of this Journal, and may perhaps be prefaced with advantage by a short account of the species which have hitherto furnished sandal wood.

The genus *Santalum* comprises about twenty species, distributed over Asia, Australia and Polynesia, although others may probably yet be discovered in New Caledonia and New Guinea.

In aspect the trees of this genus bear some resemblance to the Myrtaceæ, in having opposite, mostly entire leaves, furnished with oil glands, and flowers similarly arranged. Like the Eucalypti they have no petals, but differ in the small number of stamens (four or five) to each flower, and in having only three to five seeds attached to a central placenta.

All the species delight in dry, rocky localities, particularly those of volcanic origin, degenerating in their yield of oil when grown in moist situations.

The most westerly species is *Santalum album*, L., a native of India and the islands of Sumba and Timor and other islands in the Eastern archipelago. The most easterly is *S. insulare*, found in the Marquesas Islands and Tahiti. The most northern species, *S. Freycinetianum*, Gaud., is found in the Sandwich Islands, and the most southerly, *S. Cunninghami*, in New Zealand.

The species which have at different times furnished the sandal wood of commerce are as follows:

S. album, L.—This species furnishes East Indian sandal wood and probably also that known as Macassar sandal wood. A variety of *S. album*, the *S. myrtifolium*, DC., which differs in its more lanceolate leaves, and occurs on the mountains in the east of Madras, is also a source of a sandal wood oil, which possesses comparatively little fragrance.

The interesting account given of sandal wood in 'Pharmacographia' may be supplemented here by some particulars given by Dr. Bidie concerning the distillation of the oil in India, and published in the Pharmacopœia of India (p. 461) from which the following quotation is taken:—

"It (the tree) is carefully protected by Government, and only the trees that have reached maturity, which they do in from eighteen to twenty-five years, are cut down. The felling takes place in the end of the year, and the trees are then stripped of their bark and conveyed to various depots where they are cut into billets, which are carefully dressed and sorted according to the quality of the wood. These billets form the sandal wood of commerce, and are sold by weight at an annual auction, native merchants congregating from all parts of India to make purchases. The pieces that are straight and have most heart wood, fetch the highest price, as the fragrance for which they are so much prized depends on the presence of an essential oil, which is chiefly situated in the dark central wood of the tree. The Mysore Government has long had establishments for extracting the oil, which is sold at the annual auctions along with the wood and chiefly bought up for exportation to China and Arabia. It is procured from the wood by distillation, the roots yielding the largest quantity and the finest quality of oil. The body of the still is a large globular clay pot, with a circular mouth, and is about $2\frac{1}{2}$ feet deep by about 6 feet circumference at the bilge. No capital is used, but the mouth of the still, when used, is closed with a clay lid, having a small hole in its center, through which a bent copper tube about $5\frac{1}{2}$ feet long is passed for the escape of the vapor. The lower end of the tube is conveyed inside a copper receiver, placed in a large porous vessel containing cold water. When preparing the sandal for distillation the white or sap wood is rejected, and the heart wood is cut into small chips, of which about 2 maunds or 50 lbs. are put into the still. As much water is then added as will just cover the chips, and distillation is carried on slowly for ten days and nights, by which time the whole of the oil is extracted. As the water from time to time gets low in the still, fresh supplies are added from the heated contents of the refrigerator. The quantity of oil yielded by wood of good quality is at the rate of 10 ozs. per maund, or 2·5 per cent. It is transparent and of a pale yellow color, and has a resinous taste and sweet peculiar smell, which is best appreciated by rubbing a few drops of the oil on the warm hand. The specific gravity is about 0·980."

Santalum insulare.—A native of the Marquesas and Society Islands. The wood of this species was observed by Captain Cook, in his voyage round the world, to be used by the natives of Tahiti under the name of *Eai* or *Eahei*, for perfuming cocoa nut oil.

Santalum Freycinetianum, Gaud.—A native of the Sandwich Islands. Together with its varieties, *ellipticum* and *paniculatum*, and *Santalum pyrularium*, A. Gray, it furnished, for a number of years, the sandal wood of these islands. The natives distinguished only two kinds of the wood, which they called *Lan keokeo*, or white, and *Lan hulahula*, or red. From 1790 to 1820 numerous vessels called at the Sandwich Islands for sandal wood, and as much as $400,000 was realized from this trade in one year by King Kamehameha. The destruction of the trees was carried on in such a reckless manner that when Dr. Seemann visited Oahu in 1849, he saw only a few bushes not exceeding three feet high, at a place called Kuaohe, and only a few isolated specimens were left of the magnificent groves that formerly covered parts of the islands of Hawaii, Mani, Oahu and Kauai. An attempt was subsequently made to sell the scented wood of *Myoporum Sandwichense*, A. Gray, in order to revive the trade, but it did not succeed.

S. Homei, Seem.—The discovery of this sandal wood tree in the island of Eromanga in 1829 diverted the sandal trade to that island. The violent treatment received by the natives from sandal wood collectors led to difficulties which resulted in the death of the celebrated missionary, John Williams, in 1839. This source also became gradually worked out, although in 1859 the wood was still so plentiful that one firm employed sixty men to cut it in the bush. On a specimen of *S. Homei* in the British Museum there is a note in McGillivray's handwriting to the following effect:—"Produces the greater part of the sandal wood shipped from Eromanga, and formerly also from the New Hebrides. Nearly extinct. May, 1859." Another specimen dated February, 1860, bears the remark, "Now done." From this it would appear that this source of sandal wood was exhausted about 1860. Specimens of *S. Homei* also occur in the same herbarium from the Isle of Pines and New Caledonia.

Santalum Yasi, Seem.—The wood of this tree was for a long time purchased from the natives of Fiji by the Tongan Islanders, who used part of it and sold the remainder to the Samoans, by whom it was used for perfuming the cocoa nut oil with which they grease their naked bodies; for this purpose it was first grated on one of the mushroom

corals (*Fungia*).[1] As soon as the existence of sandal wood in Fiji became known to European traders, it was speedily carried away to the Chinese and Polynesian markets, so that in 1816 there was scarcely enough left for home consumption, and to save the tree from extinction, one was planted in the gardens of the Mission Station at Bua, in Vanua Levu, the island where it was most abundant. From this tree Dr. Seemann obtained the specimens used for illustrating the plant in 'Flora Vitiensis.' In 1840 the tree was so rare that even the Fijians paid fancy prices for pieces of the wood. The interior of these islands has, however, not been thoroughly explored, so that it is possible some trees may yet be found there.

Santalum austro-caledonicum, Viell.—The sandal wood of this tree was obtained from Mare in 1841, and from Vate in 1843. In New Caledonia it is known to the natives as *Tibean.* The natural woods having been nearly exhausted in New Caledonia, the tree has lately been cultivated, and a small quantity, valued at £8, was exported from Noumea to France in 1882.

S. Cunninghami, Hook., is said to yield sandal wood in New Zealand.

Exocarpus latifolius, R. Br.—A specimen of the wood of this tree was exhibited as West Australian sandal wood ("*S. latifolium*") at the International Paris Exhibition of 1878, and is now in the Museum of this Society. It possesses but little fragrance.

Australian sandal wood is received in this country from Adelaide and Freemantle. It yields less oil of a less fragrant odor than the wood of *S. album.*

Fusanus spicatus, R. Br. (*Santalum cygnorum,* Miq.) This tree has a wide range through South and West Australia, and a large export of the wood has gone on annually, chiefly to China, the exports in 1884 having amounted to 2620 tons, at an estimated value of £8 per ton, that of *S. album* being about £40 per ton. The export is expected to continue for some years to come before the source is exhausted. There is a duty of about 5*s.* per ton on all the sandal wood exported.

Fusanus persicarius, F. Muell. (*S. persicarium,* F. Muell.), is stated

[1] In reply to an inquiry I made at the British Museum Mr. S. O. Ridley informs me that the species of Fungia most likely to be used is *F. dentifera,* Dana, which is sometimes five inches long, and has large strong teeth. Being elongated it could be readily grasped by the hand, and would answer the purpose well. As a new name for this species will probably soon be published I have not mentioned the species in the text.

by Rosenthal to yield sandal wood in West Australia, and *S. lanceolatum*, R. Br., in North Australia, New South Wales and Queensland, but I can find no account of their exportation.

Eremophila Mitchelli.—Dr. Bancroft presented a specimen of this wood to the Museum of this Society, stating that it was known in Queensland as sandal wood. It has a weak fragrance not exactly like sandal wood, and the heart wood is of a deep brownish-red color.

Venezuela Sandal Wood.—A specimen of this wood was presented to the Museum, together with a fine sample of the oil, by Messrs. Schimmel & Co., of Leipzig, who stated that it came from Puerto Cabello, in Venezuela. It is the source of the W. I. sandal wood oil of commerce. It has already been pointed out in 'Pharmacographia,' second ed., p. 603, that this oil may be distinguished by deviating the ray of polarized light 6·75° to the right, while oil of sandal wood deviates it 18·6° to the left in a column 100 millimetres long.

The name of sandal wood bark having been applied in Mexico to what is probably the bark of a species of *Myroxylon*, and *Bucida capitata* being known in the West Indies, according to Grisebach, as sandal wood, it seemed probable that the name might be applied in Venezuela to some other tree, since the specimen of wood presented to the Society appeared unlike the wood of *Myroxylon* or, so far as I could ascertain, that of Combretaceous trees. Accordingly, I wrote to Mr. R. Conn, the British Vice-Consul at Puerto Cabello, who has kindly forwarded a living specimen of the plant and two dried specimens, but unfortunately neither leaves nor fruit were then obtainable. So far as can be judged from the leaves the plant belongs to the *Rutaceæ*.

As the plant does not appear to exist in the national herbaria at Kew, or at the British Museum, a brief description may be placed on record here. The stem is branched in an irregularly dichotomous manner, the branches being erecto-patent. The bark is thin and brittle, resembling in general appearance that of jaborandi or quassia. The leaves are alternate below, becoming more or less opposite on the twigs. The leaves are five-foliolate and imparipinnate. The leaflets are opposite, with a petiole about a quarter of an inch in length, entire at the margin, thin but somewhat rigid when dry, ovate, lanceolate, and acuminate, somewhat shining above but glaucous underneath. When held up to the light they are seen to contain innumerable oil receptacles, which, like those of jaborandi, vary in size in the same

leaf. The odor of the leaves and bark also recalls that of jaborandi. In shape and venation of the leaves the plant approaches the genus *Spiranthera*, but the leaves are much thinner. Until flowers and fruit can be obtained the plant must, therefore, be considered to be one hitherto undescribed.

Mr. W. Kirkby at my request has kindly cut sections of the wood of *Santalum album*, the Macassar sandal wood, and that from Venezuela presented by Messrs. Schimmel & Co. The first two present very little difference in structure, but the Venezuela wood has the porous vessels arranged in distinct lines, as seen in the transverse section.

Of the Japanese sandal wood mentioned in 'Pharmacographia,' I have been able to ascertain nothing, except that true sandal wood (*S. album*) does not grow in Japan. The only trees mentioned by Franchet and Savatier belonging to the order in that country are *Exocarpus latifolia*, R. Br. (*Santalum latifolium*), and *Buckleya lanceolata*, Miq., but neither of these appear to have native Japanese names, and presumably are not used like sandal wood. Nor have I been able to ascertain what wood it is that is exported from Nossi-be under the name of sandal wood, or the source of the kind exported to this country from Zanzibar, but I am informed by a distiller of sandal wood oil that the latter is considered almost worthless for purposes of distillation.

Oil of Sandal Wood.—Of all the different species of sandal wood above mentioned there appear to be only two used at the present time as sources of the volatile oil of commerce (unless the wood yielding the Macassar oil proves to be derived from a distinct species), viz., *Santalum album*, furnishing the East Indian and Macassar oil, and the Venezuela tree furnishing West Indian "Sandal wood oil." Inquiries kindly made for me by Mr. C. Umney show that all the sandal wood during the last two years imported into this country has come from Bombay, except two lots from Zanzibar, offered on February 19 and April 16 of 1884, and a small quantity from Champion Bay, but these were regarded as of indifferent quality.[1] The Bombay sandal wood, as imported, varies so much in yield of oil that those who are accustomed to buy the wood for distillation are often greatly

[1] I learn from another source that sandal wood from the Pacific Islands and Australia has very little scent, and is used in this country for furniture and cabinet work only.

deceived in their estimate of its yield. Mr. Umney states that the largest percentage obtained by him has been 4·5, but that sometimes less than a third of this quantity will result from careful distillation. The amount obtained also greatly depends upon the fine state of division to which the wood is brought before distillation. This is effected by first incising or chipping the logs by powerful machinery, and then disintegrating them with special tearing or rasping apparatus or with mill stones.

The Indian oil, in Mr. Umney's opinion, is imported into this country to the extent of not more than 1500 lbs., and often reaches England in a discolored state, containing fixed oil and traces of water, and is rejected by wholesale druggists for medicinal purposes, the whole import being purchased for use in perfumery.[1]

The essential oil used in this country realizes a higher price than either Indian or German oil; the latter in some cases contains oil from cedar wood or inferior sandal wood mixed during the process of distillation. Mr. Umney believes that the continental distillers are far in advance of the British in their superiority both of plant and of the knowledge necessary for the production of this and other essential oils, two well known German firms probably distilling three-quarters of the whole quantity used in Europe.

The above statement concerning the adulteration of oil of sandal wood having reached me from several sources, I obtained a sample of the oil, as well as a number of commercial samples of sandal wood oil, with a view to ascertain what variation might exist in their specific gravity. Examined at my request by Mr. W. H. Ince the following results were obtained :[2]—

Distilled in	Sp. gr.	Source.
1. Germany	·9797	E. Indian wood.
2. Germany, same firm	·9754	E. Indian wood.
3. Germany, different firm	·9756	E. Indian wood.
4. Germany, same firm as 1, 2,	·9738	Macassar wood.
5. Germany, same firm as 1, 2,	·9650	W. Indian wood.
6. English	·9713	E. Indian wood.

[1] According to Dr. Dymock as much as 12,000 lbs. of this oil are imported into Bombay from the Malabar coast, the oil being worth 8½ rupees per lb., and it is used chiefly for perfumery.

[2] I am informed by Mr. A. C. Abraham that two samples of the oil purchased in London gave respectively the specific gravity ·9753 and ·9771. The German specimens were obtained from firms of the highest reputation.

It will be observed that with the exception of No. 5 all the specimens were of higher specific gravity than that recognized in the new British Pharmacopœia, 0·96, although lower than a sample obtained from the India Museum, and which had a specific gravity of ·9901. The Pharmacopœia of India gives the specific gravity as ·980, and the United States Pharmacopœia ·946. It is probable, therefore, that none of the samples examined by Mr. Ince could have been adulterated with cedar wood oil, since the addition of that oil (of specific gravity ·9480) would have lowered the density. The low specific gravity given in the United States Pharmacopœia indicates, however, the possibility of the West Indian oil being used extensively in that country. This supposition agrees with the information I have received from distillers of the oil, that this oil is chiefly exported to the United States. Mr. T. Farries also informs me that it has very little sale either in this country or in Australia.

The oil of cedar wood obtainable in commerce is even more free from color than sandal wood oil, and if prepared, as I am informed, from the refuse of cedar pencil works, is probably rectified carefully to free it from color, since the oil distilled from a closely allied species, *J. Bermudiana*, in Jamaica, by M. Bowrey, judging from a specimen recently presented by him to the Museum of this Society, has a reddish brown color. A sample of oil of cedar obtained in English commerce has been, at my request, examined in the Society's laboratory by Mr. W. H. Ince, who finds that it has a specific gravity of ·9480, and treated with various reagents presents, as compared with a sample of East Indian oil of sandal wood of specific gravity ·9901, received from the late East India Museum, the following characters :—

	Cedar oil.	Sandal wood oil.
Concentrated sulphuric acid	Burnt sienna color.	Brown with black clots.
Chromic acid	Brown with black clots.	Ditto.
Nitric acid	Brown color.	Brown color.
Concentrated solution of chloride of zinc	No result.	Makes it gelatinous.
Solution of bromine in chloroform	No result.	No result.
Mercuric chloride	No result.	No result.
Hydrochloric acid	No result.	No result.

The specific gravity of oil of cedar wood being considerably lower than that of sandal wood, it occurred to me that it would be impor-

tant to determine the quantity of the former that could be added to sandal wood oil without being readily detected by the difference in specific gravity. Mr. Ince kindly made some experiments for me with this end in view. These were conducted in a room, the temperature of which was 65° F.

The addition of 10 per cent. of cedar oil was found to lower the specific gravity of the oil from the India Museum to ·9789, or rather higher than the average specific gravity of the "East Indian" oil of commerce.

In order to see if this quantity of adulteration could be detected by the greater or less solubility of the oil in alcohol, some experiments were made on the solubility of the various oils with alcohol of different strengths. From these experiments it results that cedar wood oil forms a white cloudy mixture with its own volume of methylated alcohol of specific gravity ·839, while No. 1 (see table) is perfectly soluble; but one volume of an equal mixture of sandal wood oil and cedar oil under the same condition dissolves perfectly.

It being thus evident that sandal wood oil might be adulterated with half its volume of cedar oil without being detected by the use of spirit of this strength, proof spirit was next tried, but neither oil being perfectly soluble in it, a mixture of one part of proof spirit and three of rectified spirit was used. This had a specific gravity of ·920. With this solvent the following results were obtained:—

Nos. 1 and 3 dissolved in an equal volume of it. Of the oil from the India Museum and No. 6, one c. c. required 1·1 c.c. to dissolve it Of No. 4, one c.c. required 1·3 c.c. of the solvent.

One c.c. of oil of cedar required 5 c.c. for solution, but 10 per cent. of the latter oil added to the India Museum oil increased its insolubility very slightly, 1 per cent. requiring only 1·3 c.c. of the solvent.

Conclusions.—From the above facts it appears that whilst oil of cedar may be recognized by its insolubility in an equal volume of alcohol of specific gravity ·920, its admixture with sandal wood oil to the extent of 10 per cent. cannot be easily detected.

It is quite possible that the higher specific gravity and less solubility of the oil from the India Museum may be due to an admixture[1]

[1] Tested for sesame and cotton seed oils negative results were obtained. But the greater insolubility of the Indian oil and higher specific gravity indicates the probability of fixed oil being present in it.

of some fixed oil, possibly of sandal tree seed oil, which is used for lamp oil in Mysore. This question, however, can only be settled by the distillation of the wood and examination of the oil in India by a competent chemist.

The West Indian oil, as shown in 'Pharmacographia,' may be detected by its optical properties, and is probably derived from an undescribed rutaceous tree.

The specific gravities obtained indicate that the figure given in the B.P. is too low.

The oil originally recommended for use in medicine by Dr. T. B. Henderson in the *Medical Times and Gazette*, (June 3, 1865, p. 571) was that f *S. album* var. *β. myrtifolium*, the wood of which is said ('Pharmacographia,' 2nd edition, p. 602) to be nearly inodorous. But it is only during the last few years that sandal wood oil has extended its reputation widely. The question arises therefore, is the therapeutic property of the oil due to true oil of sandal wood, to oil of cedar, or to the oil of the Venezuela tree? The species of the genus *Juniperus* are known to have physiological effects on the urinary organs, and cedar wood oil may be possessed of as great, or greater, therapeutic value than the sandal wood oil. Since all these oils are to be met with in commerce, it would be more satisfactory to know which is the most valuable remedy, but this point is one to be determined by the medical profession.—*Pharmac. Jour. and Trans., March* 27, 1886, *p.* 819-822.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 20, 1886.

The seventh meeting of the present series was held this day; Mr. Wallace Procter in the chair. The minutes of the last meeting having been read, and no corrections being required, they stand approved.

The following donations to the library from our fellow member, Mr. A. B. Taylor, were placed on the table: A copy of the first edition of the United States Dispensatory, by Drs. Wood and Bache; Noads' Chemical Analysis, Parts 1 and 2; Cooke's Chemistry; Lecture Notes for Chemical Students, by E. Frankland; Précis d' Analyse pour rechercher des Altérations et Falsifications des Produits Chimiques et Pharmaceutiques, par Gellée; also quite a number of fine steel engravings of several distinguished scientists, which the actuary was empowered to have arranged in a suitable book for their better preservation.

The actuary referred to the question of *ultramarine in sugar*, which had been alluded to in the last meeting; since then he made inquiries at the Franklin Sugar Refinery and was informed that ultramarine is used only to correct the

yellowish tinge which exists in the sugar refined from certain inferior grades of stock; the persistence with which this color adheres to the sugar is such that it can only be hidden by the supplementary bluing of the mass. But the sugar branded crown A or crystal A is perfectly pure and will be all that is needed; it is worth about one-eighth of a cent more than the next best grade. These two brands of sugar are refined from the best raw stock which will show 94 or 96 per cent. of pure sugar before refining. It was asked if these sugars were not soft sugars, and it was stated that such was understood to be the case.

A paper entitled *Laboratory Notes* by Mr. A. H. Cohn, of the graduating class of this year, was read by him, and referred to the committee on publication.

Prof. Maisch stated that this paper only enforced what he had so frequently urged upon young men, that is, to prepare everything possible in their own stores themselves, thus enabling them to assure their patrons and the physicians who entrust their prescriptions to them, of the quality of the articles dispensed, and this he thought ought to apply to many chemical as well as most galenical preparations. Mr. Procter stated that his own experience was that it was economical as well as proper; for he found that in the matter of fluid extracts he could make, and afford to sell, strictly first-class articles at the same prices as manufacturers of first-class charged for their goods.

A prescription was submitted with the question: what was the result and what should be the appearance of it when finished. It is as follows:

℞ Potassii Carbon..... ℈i
Ext. Buchu fluid..... ℥ij
M. Sig.—A teaspoonful in water.

A number of those present thought it all right and that it would be quite clear and sightly, but experience showed that the alkali in a few moments caused a soapy deposit which adhered to the sides and bottom of the bottle. Prof. Maisch said that it would be well if some one would experiment and ascertain the character of the precipitate. Mr. Procter offered to do this.

Prof. Maisch called the attention of the meeting to *Lanolin*, the fat prepared from suint, the soap obtained by washing sheep's-wool; the specimen was made by Messrs. T. Metcalf & Co, of Boston, and labelled *Agnine*, as a registered trade mark. The very rank odor which adheres to it very persistently is unfortunate, but the speedy absorption of the fat when rubbed upon the skin, and the entire disappearance of the odor as soon as the grease is absorbed, are quite noteworthy. A number of experiments have been made to remove the odor and dark color. One specimen had been digested with charcoal for two months; another had been treated with peroxide of hydrogen which had removed its odor very greatly, but it seems desirable to free it entirely from both odor and color.

Two months ago Prof. Maisch spoke of the *Raiz del Indio* and expressed the opinion that it was the same root as had been examined by Mr. Voelcker in 1875. Under the name of Cañaigre root he had received several specimens which were identical with Mr. Voelcker's root and with the root of Rumex hymenosepalum, received from Mr. Wm. Saunders, superintendent of gardens in Washington. Recently, Mr. Clifford Richardson, assistant chemist in the Agricultural Department at Washington, had furnished a copy of the analysis published in the annual report of that department for 1878, p. 119; this analysis,

like that by Mr. Voelcker, shows the presence in the root of various derivatives of chrysophanic acid or allied compounds, like emodin and erythroretin, the quantitative results being: Emodin, trace; yellow resin, ·93; red substance soluble in alcohol, 10·48; sugar and red substance, soluble in water, 10·44; rheotannic acid, 23·45; gum, pectin and brown color, 6·41; albuminoids, 5·21; aporetin, 4·78; starch, 18·00; cellulose, 4·52; ash, 4·38, and moisture, 11·17; total, 99·77.

Mr. Procter asked if all *tannin producing substances* were equally valuable for tanning in proportion to the tannin they contained. Prof. Sadtler said that he thought that they were not, and that hemlock and the oak barks were almost the only useful ones, and sumach was somewhat used; chromate of sodium had been found good only for wash leather and thin skins, and it was not valuable for general tanning purposes. Prof. Maisch stated that, in tropical countries, many substances, almost unknown in other localities, were used for tanning, such as the bark of many trees, certain leguminous fruits, different parts of the clove tree, and other myrtles.

Prof. Maisch exhibited specimens of two species of *potato*, one being Solanum tuberosum var. boreale, which is indigenous to Arizona (see Am. Jour. Phar., 1884, p. 344), and the other Solanum Maglia, which is indigenous to South America, from Chili southward, the specimens having been sent by Messrs. Sutton & Sons, of Reading, England. The first species mentioned had been cultivated by Prof. Maisch for two years without blooming, and producing very few tubers, but numerous and very long, thin rhizomes; he attributed this to the fact that the plants had been kept well watered, while they should have been grown in rather dry soil; the second species, however, is stated to grow in low and even swampy ground.

Prof. Trimble exhibited some *oil of maize*, obtained from the corn grain by pressure with the presses usually employed for making linseed oil. Its sp. gr is ·922. It has a bright yellow color and a slight peculiar odor.

Mr. Walling asked the question whether *bathing whiskey* was legitimate if made by using diluted alcohol, colored with caramel, and odorized with a small quantity of fusel oil. The reply was made that such an article was sold by some of the members, and had given satisfactory results to the physicians who prescribed it; but others present sold for this purpose commercial raw whiskey, which appeared to be better for bathing purposes than diluted alcohol.

This question opened the other one of the character of *whiskey* suitable for medicinal use internally, and the statement made was that Gibson's whiskey had proven the best, but probably was not superior to other pure whiskies at least two years old, and purchased from the manufacturers in original packages of a barrel; it of course becomes a year or two older before it is all sold off.

Thos. S. Wiegand, *Registrar.*

Phytolacca Decandra in Orchitis.—According to the *Lancet*, the fluid extract of *Phytolacca decandra* is used internally for orchitis, in doses of from 4 to 6 minims, every three or four hours. A salve made of the extract mixed with extract of belladonna is also rubbed into the skin over the affected part. The root is said to have antisyphilitic and antiscorbutic properties.—*N. Y. Med. Jour.*, Jan. 23, 1886.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The St. Louis College of Pharmacy held its twentieth annual commencement on the evening of March 16th, the degree of Ph. G. being conferred upon thirty-three candidates. Prof. Wall delivered the valedictory address. The Alumni prizes were awarded to R. Kring, of the senior class, and to E. E. Hunter, of the junior class. A reunion of the graduating class took place on the preceding evening, at a supper provided for by the faculty.

Cincinnati College of Pharmacy.—The fourteenth annual commencement occurred on the evening of March 18th, when addresses were delivered by the President, Mr. Geo. W. Voss, by Hon. W. A. Davidson, and by Prof. Judge. The prizes offered by the Board of Trustees, consisting of a silver medal for the best junior examination, and a gold medal for best senior examination, were awarded, the former to Jos. W. Hall, and the latter to E. A. W. Stahlhuth. The professors' prizes, offered for the best examinations in the respective branches, and consisting of gold medals, except the materia medica prize, a microscope, were distributed, in theoretical and analytical chemistry, to C. S. Ashbrook; in theoretical pharmacy, to E. A. W. Stahlhuth; in practical pharmacy, to F. A. Müller; in materia medica, to E. A. W. Stahlhuth, and in botany, to Mrs. C. D. Platt. The following gentlemen received the degree of Ph. G.: C. S. Ashbrook, Ada, O.; Frank H. Coblentz, Springfield, O.; Edward Doerr, Cincinnati, O.; Chas. A. Fieber, Cincinnati, O.; Warren W. Ford, Cincinnati, O.; John Krause, Cleveland, O.; O. E. Moeglich, Columbus, O.; Ferd. A. Mueller, Indianapolis, Ind.; Joseph W. Plaster, Lafayette, Ind.; Otto E. Plath, Sleepy Eye, Minn.; A. W. Schneider, Cincinnati, O.; E. A. W. Stahlhuth, Columbus, Ind.; Fred. H. Swift, Oberlin, O.; William Valentine, Cincinnati, O.; E. T. Warnock, Greenup, Ky.; Charles L. Zimmermann, Madison, Ind. After the close of the exercises the graduates were entertained at a banquet, provided by the Alumni Association of the College.

New York College of Pharmacy.—The fifty-sixth annual commencement took place at Steinway Hall, on the evening of March 30th, the degree of Ph.G. being conferred by the President, E. McIntyre, upon eighty-four candidates. An address to the graduating class was delivered by Hon. Judge J. R. Brady. G. A. Palmer, J. L. Peck and O. C. B. Grom received the Alumni prizes, consisting of a gold, a silver, and a bronze medal.

Massachusetts College of Pharmacy.—The eighteenth annual commencement takes place at Meionaon Hall, on the evening of March 15th.

A New Heart-Tonic.—Prof. Wagner recently employed the new heart-tonic, the nitro-salicylate of caffeine, in his clinic in Buda-Pesth, on twelve patients (*Oroosi Hetilap.*, No. 32, 1885). The daily dose varied from 3 to 18 grains. The results were the same as those observed by Riegel. The remedy is a rival of digitalis, but has the great advantage of being more rapid, and never accumulative in its effect. The only drawback seems to be, that with the discontinuance of the remedy its effect also quickly ceases. At the beginning, but small doses should be administered, as many patients evince a peculiar idiosyncrasy against the drug.—*Med. and Surg. Rep.*, Jan. 30, 1886.

EDITORIAL DEPARTMENT.

Nostrums on the War Path.—We copy the following from the *Philadelphia Record* of April 8th:

"A case of unusual interest to physicians and druggists was tried yesterday in Common Pleas Court No. 4, before Judge Arnold. The point at issue—and of vital importance to the medical fraternity throughout the country—was as to how far a lecturer before a medical class could adversely criticise a patented preparation, and whether he could be held responsible for such criticism.

"Frank E. Engelman, the proprietor of a nostrum (snuffene) for the cure of hay fever, brought suit against Dr. Carl Sieler, of the University of Pennsylvania, for damages alleged to have been sustained on account of a lecture delivered by the defendant on October 14, 1884, before the alumni of the Philadelphia College of Pharmacy, in which he advised his hearers not to use the article manufactured by Mr. Engelman. The plaintiff alleged that in consequence of these remarks the druggists ceased recommending his powders to customers, and in some instances had removed the article from their showcases. He was unable to tell just how much his trade had fallen off, but believed that he had lost $1000, though he did not produce any books to show this. It was offered in evidence that Dr. Seiler had advised the druggists not to use the nostrum, and the following language used by the physician in his description of the article was also produced: 'I don't know what it is. I suppose it is nothing but a little silicate of soda, or a little borax, or quinine and borax; but don't use it or any of these nostrums. They are bad, for the simple reason that they themselves irritate the mucous membrane. They all have, to a certain extent, an effect good or bad, but that effect will not last. Very soon the secretion will cover the mucous membrane again, and the trouble will still be there. Also, very soon the system becomes accustomed to the nostrum and prevents the thorough impregnation of the mucous membrane, having its peculiar effect upon the circulation of the nose itself.'

"The plaintiff called several druggists, with a view of showing that their sales had fallen off in consequence of Dr. Seiler's lecture; but these witnesses could not say that their sales had been curtailed in consequence of any remarks of Dr. Seiler. One druggist testified that he had recommend the article because it was put up in convenient boxes, and was handy to carry in the pocket.

"The defense did not consider it necessary to offer any evidence.

"Judge Arnold charged the jury briefly and ordered them to render a verdict in favor of the defendant. He said that Dr. Seiler's statements before the alumni of the College of Pharmacy was a mere expression of opinion, and that it was devoid of any element of malice. It was the lecturer's privilege, under the circumstances, to give his views to his class, and it was the occasion of the highest privilege for the defendant to give such expression of his views. It was not shown that Dr. Seiler had any malicious motive, and some people might think the defendant did the public a great benefit; but it was not for the Court to say whether he had or not. It was enough for the Court to say that it was the defendant's right to lecture upon the medicine. As there was no evidence to support the plaintiff's case, and as it was not shown that the defendant had acted in a spirit of spite, or had tried to damage the plaintiff, the Court was compelled to direct the jury to return a verdict for the defendant."

While in the above case honest criticism has been upheld, a good deal of honesty seems also to be at stake in another case, which, if ever pressed to prosecution, bids fair to achieve considerable notoriety. We have before us a printed circular, dated Baltimore, March 25th, in which the manufacturers of a nostrum inform the drug trade, and all other dealers in proprietary medicines in the United States, that suits for damages have been instituted against firms in Detroit, St. Louis, and Baltimore, and that "other suits will follow

against all non-secret medicine manufacturers, and wholesale and retail dealers, who make, sell or deal in Iron Tonic Bitters, Brown's Iron Tonic or other Iron Remedies, or medicines containing iron that either directly or indirectly trespass upon our rights as the inventors and owners of the genuine Brown's Iron Bitters." It does not seem to be claimed that the label or wrapper of the nostrum had been copied or imitated, and it appears to be preposterous that the names should be considered an infringement of the copyrighted name of the nostrum. Can it be possible that some of those threatened preparations are to be involved in law suits, because they are *non-secret?* We have often advocated that the demand for family medicines should be supplied by remedies, the composition of which to be known at least in the localities where they are used, and we still believe that if such a plan had been adopted years ago, the country would not now be flooded with secret nostrums, many of which are positively injurious. The course indicated is certainly an honest one, and if pharmacists make preparations of iron and bitter principles, according to formulas which are not kept secret, we sincerely hope that they will be legally protected in their honest endeavors to supply the public with such remedies, in the place of nostrums of unknown composition.

Illinois College of Pharmacy.—We have learned that under this title a charter has recently been obtained in Chicago by Dr. Joseph Cummings, President of the Northwestern University, Messrs. E. H. Sargent, T. H. Patterson, O. Oldberg and others. Whatever causes may have led to the organization of a second College of Pharmacy in one and the same city, they are to be deeply regretted, and we hope that a union of the two institutions may not be regarded as an impossibility. The cause of pharmaceutical education is undoubtedly best served by concentrating, in suitable localities, those interested in one common effort towards the end in view, sinking individual opinions, if necessary, in preference to weakening through division.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Year-Book of Pharmacy; comprising abstracts of papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and foreign journals, from July 1, 1884, to June 30, 1885. With the Transactions of the British Pharmaceutical Conference at the twenty-second annual meeting, held at Aberdeen, Sept. 6, 1885. London: J. & A. Churchill. 8vo, pp. 566.

Proceedings of the American Pharmaceutical Association at the thirty-third annual meeting, held at Pittsburgh, Pa., September, 1885; also, the Constitution, By-Laws and Roll of Members. Philadelphia. 8vo, pp. 694.

The first one of these annuals was received early in March; the second one has just been distributed. The abstracts of papers published during the year preceding last July, occupy respectively 291 and 360 pages; and the minutes, with reports and papers read, 173 pages in the former and 222 pages in the last-named volume. Condensed accounts of the meetings of both Associations were published in the October number, 1885, of our journals, where also a

brief synopsis of the various papers will be found. Several of the papers have been published in full in the JOURNAL. An important addition to the Proceedings is the New York and Brooklyn Formulary of unofficinal preparations, which thus assumes a national character and which will, hereafter, be extended so as to embrace also the unofficinal preparations used in other parts of North America, always provided that those interested will not fail to communicate their observations in this line to the Committee on Unofficinal Formulas, Dr. Chas. Rice, Chairman, College of Pharmacy, 209 East 23d street, New York. The Proceedings contain the phototype of the late Henry B. Parsons, who died shortly before the last meeting. The picture, we understand, was made from a photograph taken several years ago, the last one that could be procured by the committee.

Proceedings of the Illinois Pharmaceutical Association at the sixth annual meeting, held in Chicago, Sept. 22-24, 1885. Chicago: T. N. Jamieson, Secretary. 8vo, pp. 85.

The meeting was noticed on page 632 of the December number of this Journal.

Proceedings of the New Hampshire Pharmaceutical Association at the eleventh and and twelfth annual meetings, held in Concord, Oct. 14, 1884, and Nov. 3, 1885. Concord, N. H. 8vo, pp. 64.

The thirteenth annual meeting will be held in September next.

Erythroxylon Coca and Its Derivatives.—A *resumé* of their history, botanical origin, production and cultivation, chemical composition, physiological action and medicinal preparations; embracing reports on their employment in general and minor surgery, etc., etc. Compiled by the scientific department of Parke, Davis & Co. Detroit and New York. 8vo, pp. 103.

About one-third of the pamphlet treats of the botanical, economical and chemical history of the plant; the remainder, of its uses and those of cocaine in medicine and surgery. It is a very useful and timely compilation of papers on a subject which has attracted considerable attention for several years.

Coca, Cocaine and its Salts: their history, medical and economic uses, and medicinal preparations. By William Martindale, F. C. L., etc. London: H. K. Lewis, 1886. 16mo, pp. 69.

The scope of this little work is similar to that of the preceding one; but the information is given in a necessarily very condensed form, which is more especially the case with the uses in medicine. The little book is handsomely printed in blue ink upon green-tinted paper.

Cocaine in Hay Fever. A lecture delivered at the Chicago Medical College. By Seth S. Bishop, M. D., etc.

Reprint from the Journal of the American Medical Association.

The Druggists' General Receipt Book; comprising a copious veterinary formulary, numerous recipes in patent and proprietary medicines, druggists' nos-

trums, etc., perfumery and cosmetics, beverages, dietetic articles and condiments, photographic chemicals and formulæ, trade chemicals, scientific processes and an appendix of useful tables. By Henry Beasly. Ninth edition. Philadelphia: P. Blakiston, Son & Co., 1886. 16mo, pp. 507. Price, $2.25.

The volume now before us is the revised edition of a work which has been in the hands of druggists for many years, proving its utility and value by the new editions which have from time to time become necessary, and which have been noticed in previous volumes of the JOURNAL. The present edition has been revised and enlarged, and though it covers about the same number of pages as the eighth edition, room has been provided for the new material by increasing the text on each page about three lines.

A Lecture on Piper Methysticum (Kava-kava). By Dr. L. Lewin.

A condensed account of the subject of this lecture will be found on page 138 of our March number. The complete translation made from *Berl. Klin. Wochenschrift*, was published by Parke, Davis & Co.

Asa Gray. 8vo, pp. 16. A biographical sketch of the celebrated American botanist. Written by Prof. C. S. Sargent and published in the *Sun* newspaper, Jan. 3, 1886.

Twenty-seventh Annual Report of the Inspector of Milk and Vinegar, from April 6, 1885 to December 31, 1885. Boston. 8vo, pp. 60.

Outlines for a Museum of Anatomy, prepared for the Bureau of Education. By R. W. Shufeldt. Washington. 8vo, pp. 65.

Esthetics of Medicine. The doctorate address in the medical department of the University of Louisville. By Prof. H. A. Cottell, M. D.; pp. 26.

L'Épilepsie et son moyen curatif. Par H. Bonnewyn, etc. Aven une Introduction par M. le Dr. Hubert Boëns. Charleroi, 1886. 8vo, pp. 19.

A New Departure in Uterine Therapeutics. The Dry Treatment. By Dr. Geo. J. Engelmann. St. Louis. Address before the St. Louis Obstetrical and Gynecological Society; pp. 11.

The Organization of Local Boards of Health in Pennsylvania. By Benj. Lee, A. M., M. D., Ph. D. 8vo, pp. 16. Read before the Philadelphia Social Science Association.

Twenty-fifth Annual Report of the Board of Managers of the Woman's Hospital of Philadelphia. January, 1886. 8vo, pp. 44.

International Electrical Exhibition, 1884, *of the Franklin Institute.*

The following reports of examiners are before us:

Section XI. Steam engines; pp. 32.

Section XXII. Electric signal apparatus, electric registering apparatus, etc.; pp. 96.

Section XXII. Supplementary report on meteorological and other registers; pp. 13.

Section XXIX. Educational apparatus, with which is incorporated Section XIII, apparatus for high electro-motive force. pp. 56.

On the efficiency and duration of incandescent electric lamps. Report of a special committee. pp. 127.

OBITUARY.

Peter Williamson, one of the founders of the Philadelphia College of Pharmacy, died in this city March 6th, aged 91 years. He was secretary at the meeting held at Carpenter's Hall, February 23, 1821, on which occasion the organization of a College of Apothecaries was resolved upon, and he presided over the meeting held February 23, 1871, to celebrate the fiftieth anniversary of its foundation at the present hall of the College. The deceased has served the College faithfully for many years as one of its officers, and though retired from business long ago, retained his interest for its welfare. In other stations he likewise occupied many positions of honor and trust.

Dr. Nathaniel Ranck, who was for many years in business in the southern part of Philadelphia, died March 19th, at the age of 78 years.

Benjamin W. Fetters, who carried on the drug business at Third and Brown streets, died suddenly February 25th, aged 60 years.

Ralph Newton, formerly in business at 20th and Fitzwater streets, died April 13th, aged 74 years.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

Louis Dembinski, class 1877, died suddenly March 9th, at his residence, 8th street and Fairmount avenue, aged 57 years.

Henry H. Jacobs, class 1862, a member of the firm of Phillips & Jacobs, manufacturing chemists, died March 24th, at the age of 45 years.

John A. Miliac, class 1866, in business on Master and 24th streets, died there March 27th.

Charles Frederick Zeller, class 1880, died suddenly April 7th, at the age of 28 years. After having been in a wholesale drug store for some time, he was engaged in the store of Prof. Remington, and soon became conspicuous for his studious habits and zeal, which rendered him valuable to the latter as an aid in making arrangements for lecture demonstrations. He graduated with high honors, was elected assistant to the Chair of Pharmacy, and served the College for several years as curator, in which capacity he arranged the cabinet of materia medica. His health failed in the summer of 1884, and during the greater part of the following winter he was able only to attend to a portion of the duties connected with his position. A voyage to Europe in the summer of 1885 restored his health sufficiently to enable him to participate to a somewhat greater extent in the College work. In the afternoon of April 6th he was busily engaged at the College, and in the following night he was seized with hemorrhage of the lungs, which in a short time terminated his life. Ever faithful in the discharge of his duties, modest and unassuming in his demeanor, earnest and persevering in his studies, he was a favorite with the faculty, with the members, and with the students of the College.

VARIETIES.

A Novel Anticoagulant.—Prof. Zunz has presented before the Berlin Physiological Society an ingenious method of retarding the coagulation of blood in the course of experiments upon blood-pressure. It had been shown that the cause of the frequent persistent bleeding seen after the application of leeches is due to the presence of a soluble ferment in the animal. Zunz has found that an aqueous extract of the heads of leeches, injected into the blood stream, not only prevented any interruption of the experiment through coagulation, but in no wise influenced blood-pressure.—*Med. News*, March 27, 1886.

Chloropeptonate of Iron.—The *Bulletin Général de Thérapeutique* describes Dr. Jaillet's experiments which have led him to prescribe and recommend the use of chloropeptonate of iron by hypodermic, rectal, and intravenous injection, and by ingestion. The compound enters the circulatory system and is absorbed into the blood. Chloropeptonate of iron is a chemical combination of peptone and iron perchloride, which does not undergo any change from the gastric juice, nor from the alkalies of the blood. It is absorbed and assimilated just as it is administered, and produces, in consequence, a higher temperature, increased disassimilation, and more copious excretions. The appetite increases, and the patient grows thinner, but the physiological qualities of the blood improve.—*Med. Times*, March 20, 1886.

Unusual Susceptibility to Morphia.—Dr. William G. Eggleston, of Chicago, Ill., reports a case in the *Jour. Amer. Med. Assoc.*, April 10th, 1886, which is interesting on account of the facts that the drug acted in a remarkably short time, and that at times there was no appreciable interval between the anodyne and hypnotic effects. On March 13th, at 8 P. M., I was called to see A. F. H., æt. 44, who was suffering from a very severe attack of sciatica on the right side. I administered morphia, gr. $\frac{1}{8}$ with gr. $\frac{1}{200}$ of atropia. While replacing my syringe in the case the patient threw his arms across his chest, said "All right," and was asleep immediately. This was just four minutes after the injection was made. Being somewhat alarmed at such unusual susceptibility, I aroused the patient and spoke to him. I had no difficulty in awakening him, and he seemed surprised that I had aroused him. He said that the drug had had a similar effect two or three years ago, when he had taken it, and his wife confirmed his statement. Upon this information I determined to set aside my proposed treatment of the case with injections of ether, and to use morphia, with cod-liver oil and phosphorous internally. March 14th, I administered gr. $\frac{1}{6}$ morphia, with gr. $\frac{1}{200}$ of atropia, at 9 A. M. The patient had slept well the night before until about 3.30 A. M., after which the pain began to return slowly. The injections were made superficially behind the right trochanter on the affected side. Within three minutes the patient announced that he "felt it" in his arms—"a kind of numb feeling down through the elbows." Within another minute he said that he was perfectly easy. This time, however, he did not fall asleep. Another injection was made in the evening, the pain being annoying, but not so great as on the previous afternoon. Within a few seconds less than four minutes he began to say that he felt better, but was asleep before the sentence was completed. In the morning he had commenced taking teaspoonful doses of cod-liver oil and phosphorous (gr. i—f ℥ jss).—*Virg. Med. Monthly*, May, 1886.

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JUNE, 1886.

NOTE ON THE ESTIMATION OF COCAINE BY MAYER'S REAGENT.

By A. B. Lyons, M. D.

In an article published last October in the Journal, the writer made some statements with regard to the use of Mayer's reagent in estimating cocaine, which, to be of any value, require expansion and qualification. The experiments, although few in number, on which those statements were based, were carefully made, and the conclusions as nearly correct as they could be made in so bald a presentation of the subject. Recurring some time afterwards to the subject, and approaching it from a different quarter, I was led to believe that in reporting my earlier experiments I had made a blunder which ought to be at once corrected. A note was accordingly published in the Journal explaining the nature of the supposed mistake. My later conclusion, however, I find was too hastily drawn, and I owe it to the readers of the Journal to make a new and more complete statement of the facts.

It has been generally assumed that the precipitates produced by Mayer's reagent are double iodides of mercury with the alkaloidal base, having the general formula RI,H_gI_2, R standing for the alkaloidal basic radical. This theory, however, I do not find borne out by fact in the case of most alkaloids, and certainly is not true of cocaine. The precipitates produced, indeed, appear generally to vary in composition under varying conditions, and it is only by accident that the equivalent numbers originally given by Mayer and quoted in all the text books, agree with those found by observation.

On the above hypothesis each c.c. of Mayer's reagent ought to precipitate ·01515 gm. of cocaine, and the precipitate from 0·1 gm. of the alkaloid should weigh 0·292 gm. The weight of the precipitate obtained falls considerable below this, and is not constant. It averages

about 0·246 gm., but accurate weighings are not practicable, since the precipitate cannot be washed with water without loss. The observed variations, however, are too large to be due solely to this cause, and indicate clearly a variable composition in the precipitate itself. The actual weights in five experiments were 0·230, 0·245, 0·248, 0·252 and 0·271 gm. The lowest result was obtained when the reagent was added little by little, the highest when an excess was added at once.

Analysis of some of these precipitates showed that they contained much less than the theoretical proportion of mercury, which would be 0·066 (for 0·1 of alkaloid). At the same time the quantity was too great to comform with the formula $(RI)_2H_gI_2$, or 0·033. The quantity found was about ·043 (in a precipitate weighing 0·252), corresponding with the formula $(RI)_3(H_gI_2)_2$, but containing either an excess of iodine or some adhering potassium iodide from the reagent.

Variability in the composition of the precipitate must necessarily render its use in exact quantitative estimations inadmissible. At the same time, if under similar conditions results approximately identical can be obtained, it may be possible to use it in such approximate estimations as the pharmacist has occasion to make.

The use of Mayer's reagent offers, indeed, a ready means of ascertaining the alkaloidal strength of a complex fluid, of which the pharmacist may avail himself, when time and skill for carrying out an exact quantitative estimation are wanting. It is necessary, of course, to be familiar with the precautions to be observed in the use of the reagent, and to understand the sources of possible error. With a thorough knowledge of these, it may be possible to utilize Mayer's reagent in the practical examination of preparations of coca leaves, and the liability to error is perhaps no greater than in the case of most of the alkaloids estimated by its use.

When Mayer's reagent is added drop by drop to an acid solution containing cocaine (1 : 200 to 1 : 600) there is at first produced a heavy white precipitate which collects at once in curdy masses. After adding a certain quantity of the reagent, it will be found that the filtered fluid, which still gives a heavy precipitate with Mayer's reagent, produces a precipitate also in a fresh solution of cocaine. It is thus evident that precipitation is complete only when a certain excess of reagent is present in the fluid. If reagent is added until precipitation is just complete, it will be found that the fluid does in fact contain a considerable quantity of mercury. The following are some

of the results obtained in actual titrations. In each experiment 0·100 gm. of alkaloid was used.

Dilution, 1 : 200. After adding 4 c.c. of reagent, the filtered fluid began to give a precipitate with cocaine solution. It was not until 5·85 c.c. of reagent had been added, however, that precipitation was complete, and it was then found that the fluid contained mercury corresponding with 0·55 c.c. of reagent.

Dilution, 1 : 400. After adding 5 c.c. of Mayer's reagent, excess was indicated by testing with cocaine solution. For complete precipitation, however, 7·2 c.c. of reagent were required, the fluid being found to contain 2·3 c.c. in excess.

Dilution 1 : 600. For complete precipitation 8 c.c. of reagent were required; excess of reagent not estimated.

In these experiments the solution titrated contained in each case ten minims of 6 per cent. sulphuric acid. The Mayer's reagent actually used in all my experiments was made of one-half the ordinary strength, such a reagent being most convenient for general use.

It was found in general that in all cases there was required for complete precipitation of the alkaloid an excess of reagent amounting approximately to 8·5 per cent. of the solution, and if the precipitate were washed with water not containing Mayer's reagent, it was appreciably dissolved. From a study of the results of numerous titrations I deduced the following rule for interpreting the results of an experiment: 1. Correct the reading from the burette by subtracting, for each c.c. of fluid present at the end of the titration, 0·085 c.c. (if the half-strength reagent is used). The remainder multiplied by 10 will give the quantity of alkaloid indicated, in milligrams. If the Mayer's reagent of full strength is used, a correction of about 0·036 c.c. would have to be applied for each c.c. of fluid at the end of the titration, and the multiple would be 20 instead of 10.

In order that the results obtained shall be at all trustworthy, it is necessary that the reagent be added always in the same way. The first addition should not exceed two-thirds of the entire amount required, and the successive portions should consist of about 0·3 c.c. at a time, until the end of the titration is approached. My practice is to throw the fluid at once on a filter, just large enough to hold it comfortably, and run it through the same filter once or twice after each addition of reagent. This is a much more expeditious method than that of allowing the precipitate to subside, and testing the super-

natant fluid. The quantity of reagent required, no doubt, will be different if this latter method is followed. The filtrate runs through rapidly and perfectly bright. The proportion of acid used, of course, should be always the same, although in this titration the result is not greatly influenced by considerable variations in the proportion of acid.

If no acid is added, the fluid will not filter clear. It is sometimes difficult to tell just when the precipitation should be called complete. My practice is to continue addition of the reagent until two drops fail to produce at once a distinct permanent turbidity. Occasionally, however, it will be found that such a turbidity continues to be produced for some time, without the formation of a weighable amount of precipitate. In such cases one must use judgment, an indispensable factor in all analytical work.

If possible, the solution for titration should have a strength of about 1 part of alkaloid in 400, since the results of titration seem to be more uniform than in solutions either stronger or weaker than this. The results vary most in fluids containing more than 1 in 300.

Some experiments made with a modified Mayer's reagent, containing five equivalents instead of three of potassium iodide, promise greater uniformity than those obtained with the ordinary solution. A considerably smaller quantity of reagent is required, and the influence of dilution is not so great. I am not sure but that in nearly all cases the modified reagent may be substituted for "Mayer" with advantage, but the quantity of alkaloid precipitated by it in general is greater. The addition of a fixed quantity of potassium iodide to the solution before titration has a similar influence. Thus in a solution 1 : 200, requiring of the ordinary reagent about 6 c.c. to precipitate 0·100 of cocaine, it was found that after the addition of 2 c.c. of a 10 per cent. solution of potassium iodide, 5·04 c.c. of the same reagent sufficed. Of the modified reagent, only 4.8 c.c. were required.

The presence of alcohol is of course to be avoided in all titrations with Mayer's reagent. In a single experiment, however, made to ascertain its actual influence with this particular alkaloid, I found that in a solution 1 : 400, 20 per cent. had very little effect. Without the alcohol, 7·17 c.c. of reagent were required. With it, 7·28 c.c. A single experiment with glycerin seemed to show a greater influence, the quantity of reagent required being only 6·8 c.c.

Confessedly the results to be expected in the use of Mayer's reagent

for estimation of cocaine are lacking in exactness. A variation, under conditions as nearly identical as are likely to be secured in ordinary practice, amounting to 10, and even 15 per cent. of the whole quantity of alkaloid present is not uncommon, where the solution titrated is too much concentrated. Still it may be that an attempt to separate the alkaloid by other assay processes, such as are commonly adopted, will involve even greater possibilities of error, except in experienced hands, and a result which may be relied upon within even so wide a range has positive value. A more important question is: Can the titration method be applied to the fluid extract, tincture, etc., of coca leaves so as to yield useful results? This involves the question whether there is present in the drug more than one alkaloid, and if so, whether the alkaloids differ from one another greatly, (*a*) in physiological action, and (*b*) in their deportment with Mayer's reagent. We are not yet sufficiently familiar with the chemistry of the cocaine alkaloids to answer these questions. I find that the quantity of alkaloid indicated by Mayer's reagent in coca leaves and their preparations is considerably greater than the quantity of cocaine I have been able to extract by washing out the alkaline solution with ether. Chloroform will extract an additional amount of alkaloid, but the total alkaloid extracted falls short of what is indicated by Mayer's reagent—generally in the neighborhood of two per cent., estimated as cocaine. The cause of the discrepancy calls for investigation which I have not been able to give to it. As long as the subject is so imperfectly understood, I prefer to depend on actual weighings of alkaloid, but the separation from a complex fluid of an alkaloid so sensitive to the action of acids and alkalies is a matter of no little difficulty, and I am inclined to believe that experience will show that the comparative value of fluid extracts, for example, of coca leaves—can be practically ascertained by the use of Mayer's reagent.

Instead of depending on titration, in case we have to deal with solutions of the alkaloid, we may collect the precipitate on a double filter, wash slightly, in such a way as to wash the filters more than the precipitate, dry and weigh. The weight of the precipitate multiplied by 0·406 will give, quite closely, the weight of alkaloid present.

If titration is preferred, and Mayer's reagent of one-half strength is used, we may adopt the following values for the equivalent of the reagent:

Strength of Cocaine Solution.	1 c.c. of Mayer's Reagent, ½ strength, precipitates of Cocaine:
1 : 200	0·0062
1 : 300	0·0066
1 : 400	0·0070
1 : 500	0·0074
1 : 600	0·0078

Or, we may make the correction for excess of reagent as already explained. The following table may also be of service in interpreting results :

Quantity of Mayer's reagent, ½ strength, required to precipitate a given quantity of cocaine.

Quantity of Cocaine.	Measure of Fluid titrated 5 c.c.	Measure of Fluid titrated 10 c.c.	Measure of Fluid titrated 15 c.c.	Measure of Fluid titrated 20 c.c.
·010	1·6			
·020	2·7	3·1		
·030		4·2	4·6	
·040		5·3	5·7	6·2
·050		6·4	6·8	7·3
·060			7·9	8·4
·070			9·0	9·5
·080				10·6
·090				11·7
·100				12·8

Results of any titration higher or lower than those included in the table are beyond the limits of dilution or concentration admissible, and would call for repetition of the experiment. In conclusion I will only add that cocaine is by no means exceptional in its deportment towards Mayer's reagent, and the calculation of results requires in all cases an application of similar principles.

April 28, 1886.

Pereirine in Intermittent Fever.—Dr. Clemente Ferreira, of Brazil, (*Bullet. gén. de Thérap.*, April 15, 1886), reports a number of cases of intermittent fever treated successfully with hydrochlorate of pereirine after quinine and arsenic had been tried in vain. He administers thirty grains, divided into four doses, beginning four hours before the expected chill, half an hour being allowed to intervene between the doses. This effectually prevents the paroxysm, which, however, may return on the following day. On the third day, the medication is repeated as before, and after that the fever does not reappear. The value of pereirine, according to the writer, is equally great in the treatment of irregular paludic manifestations.—*N. Y. Med. Jour.*, May 8, 1886.

ON THE ACTIVE PRINCIPLE OF POLYGONUM HYDROPIPER.

By C. J. Rademaker, M. D.

In the January number of the American Journal of Pharmacy, of 1885, I saw an account of the analysis made by Prof. Henry Trimble and Herman J. Schuchard, the subject being Polygonum Hydropiper, or smart-weed. There is nothing original about the analysis, for it is merely a following of Dragendorff's scheme for proximate analysis, and is very imperfectly executed by them. According to their analysis, smart-weed contains no crystalline substance, and, according to their statement, if it does contain any, it is decomposed by the slightest heating. They also state that the acid, which I called polygonic acid, and which I first isolated in 1871, was a mixture of impure tannic and gallic acids, together with a small amount of coloring matter. I regret exceedingly that necessity compels me to differ with the able gentlemen in regard to the active principle of this drug. Prof. Trimble, I understand, read his article on Polygonum Hydropiper before the Philadelphia College of Pharmacy, and said learned body referred it for publication. It is impossible for me to comprehend why said body referred it for publication.[1]

I have used Polygonum Hydropiper as an infusion and as a fluid extract, medicinally, for a number of years, with such very satisfactory results that I was induced to isolate the active principle. That principle is polygonic acid, and the physiological action of this acid I found the same as the infusion or fluid extract; from which I concluded that the acid was the active medicinal principle of smartweed.

Preparation of Polygonic Acid.—This acid may be prepared by treating smart-weed with water, to which some bicarbonate of sodium has been added, and allowing to macerate for twenty-four hours. Or, by precipitating a fluid extract of smart-weed with basic acetate of lead. In each case separate the base by means of sulphuric acid, and the organic acid by means of ether. Allow the ethereal solution to evaporate and treat the residue with distilled water, and filter; this separates the resin (resinous acid). The filtrate is then filtered through

[1] It is well known that no scientific body is held to endorse the statements made in papers read before such body; and that no scientific journal is considered to be responsible for the opinions expressed, or the conclusions arrived at, by its contributors—as a matter of course personalities always excepted.—Editor Am. Jour. Phar.

animal charcoal repeatedly, until all coloring matter is removed. The filtrate is then treated with a solution of gelatin, in order to remove any tannic acid that might be present, again filtered and evaporated to dryness, redissolved in ether and the ethereal solution allowed to evaporate spontaneously.

Polygonic acid thus prepared crystallizes in needles (see figure).



Polygonic acid from ethereal solution. X 700.

Its solution in water does not precipitate gelatin nor produce a bluish green discoloration when added to a mixture of ferrous and ferric salts in solution, showing absence both of gallic and tannic acids. It is freely soluble in water, less so in ether, and insoluble in petroleum spirit. The heat of a water-bath does not destroy any of its properties.

I may state here that the smart-weed employed by me was not selected by "an expert botanist fully familiar with the requirements of the case," but was selected by myself; therefore I know there can be no doubt whatever about the species of smart-weed employed in my analysis.

Now, as I have shown that polygonic acid is not identical with tannic and gallic acids, it remains for the learned investigators to explain how it happened that they made such an unpardonable mistake. I presume it was due to imperfect manipulation.

Louisville, Ky.

CHLORAL-HYDRATE.

(Abstracts from Theses.)

Examination of Commercial Specimens.—Charles Erastus Weck, Ph.G., examined six different specimens, made by four manufacturers, applying first the tests of identity given in the Pharmacopœia, with which all the samples fairly agreed. Dissolved in diluted alcohol, one sample showed no reaction on blue litmus paper, while a faint acid reaction was observed with one, and a more decidedly acid reaction with four samples. On acidulating the solutions with nitric acid and testing with nitrate of silver, one was not disturbed, while the other five were rendered more or less turbid. Warmed with an equal volume of sulphuric acid, all the samples liquefied without becoming black; and, on evaporating the mixture by heat, no residue was left. On treating the warm aqueous solution with potassa solution, and the clear filtrate with iodine until it acquired a yellow color, no yellow precipitate took place on standing, but a very faint odor of iodoform was observed from three of the samples, while the remaining three samples gave, on standing, also slight precipitates.

Three specimens of chloral-hydrate, examined by Joseph V. Roberts, Ph.G., were found to be free from alcoholate by the total absence of a precipitate of iodoform after proper treatment. Two of the samples were neutral to test paper, in diluted alcohol solution, and gave no turbidity with silver nitrate, while a precipitate was produced with the third specimen, the reaction of which was decidedly acid.

Chloral-hydrate and Phenol.—The liquefied mixture of the two compounds was placed in a freezing mixture by J. V. Roberts, but did not congeal; the hot aqueous solution, treated with ammonia and nitrate of silver, readily gave a metallic mirror.

Chloral-hydrate and Camphor.—The results of the experiments were the same as in the preceding case.

Poisoning by Camphor.—Dr. J. P. Ryan (*Austral. Med. Jour.*) reports the case of a lady, who suffered from poisonous symptoms on eating a piece of camphor, which weighed about 20 grains. She began eating the camphor at two o'clock, passed through a condition resembling intoxication, and at three was nearly unconscious and in a semi-collapsed state. She was treated with 20 grains of zinc sulphate, which was followed by free vomiting, and afterwards with ammonia and strong coffee. The interest of the case lies in the smallness of the amount which could have been absorbed, and which is considerably under the amounts given for prescription in Wood and Ringer.—*Med. Chronicle*, Jan. 1886.

CHLORAL-CAMPHOR.

By Charles W. Albright, Ph.G.

(Abstract from a Thesis.)

Chloral-hydrate and camphor were mixed in different proportions. The mixture made with 1 p. of the former and 7 p. of the latter was slightly damp after seven days, but could easily be rubbed to powder; made with 3 p. of camphor, the powder became granular in a day; and with 2 p. of camphor, it was not only granular, but showed also the presence of a thick liquid. Equal parts of the two compounds soon became liquid; but, with an increase of the chloral-hydrate, a white powder remained in the liquid, and when the proportion reached 7 of chloral-hydrate to 1 of camphor, the pasty opalescent mass separated gradually a thick, oily liquid.

The liquid obtained from equal parts of the two compounds, on being agitated with water, does not decrease in bulk. It distils slowly without change and without leaving any residue when heated in a bath of ammonium chloride; but, when direct heat was applied, a portion of the oily liquid distilled over unaltered, and was followed by a white, camphor-like sublimate, which was soluble in alcohol, from which solution, on the addition of water, a thick, oily liquid was precipitated. The yellowish-brown residue in the retort gave, with alcohol, a colorless solution, which had an odor of a mixture of chloral, camphor, and cedar, and, with water, gave an oily precipitate. Chloral-camphor dissolves in 60 per cent. alcohol, and, on the addition of water, is again deposited unchanged.

On mixing solutions of chloral-hydrate in 5 p. of water, and of camphor in 5 alcohol, the mixture remains clear; but, on the addition of water, becomes turbid, and, finally, deposits an oily liquid, like that resulting from direct union. Substituting chloroform for the alcohol, the mixture of the two solutions separates into an aqueous and a denser layer, the latter, on the spontaneous evaporation of the chloroform, leaving oily chloral-camphor.

On treating chloral-camphor with glycerin, and then with water, a white flocculent mass is obtained, answering to all the tests of camphor. On boiling a mixture of equal parts of chloral-camphor, glycerin and water, an upper layer is formed, which gelatinizes on cooling to an opaque, greasy mass, which is liquefied by the heat of the hand. On boiling equal parts of glycerin and chloral-camphor in

a test-tube, a clear liquid results, which, on cooling, becomes opaque and so nearly solid that the tube may be inverted without the mass falling out; this is soluble in alcohol, though less freely than chloral-camphor, this oily compound being deposited on the addition of water.

Mixed with strong sulphuric acid chloral-camphor forms a clear liquid, passing through various shades of yellow, red, and brown, becoming nearly black, and gradually separating above small crystals uniform in shape, which, in contact with water, become liquid and sink to the bottom in globules. The acid mixture has a peculiar fragrant odor.

Nitric acid dissolves a portion of chloral-camphor, assuming at the same time a greenish-yellow color.

CHLORAL AND MENTHOL.

By Harry Vane Becker, Ph.G.

(From an Inaugural Essay.)

Menthol is usually applied in the form of cones or pencils, and from time to time solutions in alcohol, benzin, chloroform, ether, olive oil, glycerin, &c., have been suggested. The author suggests a combination of menthol with chloral-hydrate, which is prepared from equal weights of the two compounds, triturating them together and heating in a water bath not above 96° F., until complete liquefaction is effected. Thus prepared, chloral-menthol is an oily, colorless liquid, having a distinct mint-like odor, a warm aromatic and camphoraceous taste, and at 58° F. the specific gravity 1·1984. It is completely soluble in all proportions in alcohol, freely so in benzin, and also soluble in chloroform, ether and carbon bisulphide. A few drops of the liquid brought in contact with an equal quantity of sulphuric acid, gave off almost immediately a disagreeable odor, the mixture becoming yellow, then orange in the centre, and on the border surrounded by a greenish, then green band, which soon darkened. On being now stirred with a glass rod, the mixture is blue, and dissolves in alcohol with little or no color; the solution neutralized with potassa and heated, acquires a straw color, potassium sulphate being precipitated. If the mixture of oily liquid and acid be kept for some time, two layers are formed, one being dark green, the other nearly colorless; on agitation with water, the latter is dissolved, leaving a dark green unctuous mass.

Menthol melting near 92° F. the preparation is regarded as a solution of chloral-hydrate in liquefied menthol, the mixture remaining liquid.

Chloral-menthol was used by several physicians, with favorable results. Dr. L. Wolff was much pleased with its effects in several cases of facial neuralgia, and regards it as superior to menthol pencils and to chloral-camphor; while it burns and smarts to some extent, this is considerably modified by the cooling action of the menthol. Dr. L. W. Steinbach observed some relief from its use in a case of headache due to gastric disturbance. Dr. C. Seiler found it more decisive than menthol cones in subduing the pain of neuralgia of the temporal region; it produces more smarting, which, however, is not disagreeable. Dr. E. Rosenthal considered it useful in every form of neuralgia; in decayed teeth, applied with absorbent cotton, the pain was allayed in from one to five minutes; it was also used with benefit in migraine, in headache due to biliousness, and in headache due to uterine disease.

PHARMACEUTICAL NOTES.

(Contributed by the School of Pharmacy of Purdue University.)

(Concluded from May Number.)

IX. Liquor Calcis.—by M. Jay.

Ten samples of lime water, procured from Lafayette druggists, were examined. 50 c.c. of each were titrated with decinormal hydrochloric acid, and the following percentages of calcium hydrate were found:—

No. 1	0·103 per cent.	No. 6	0·155 per cent.
No. 2	0·142 "	No. 7	0·160 "
No. 3	0·142 "	No. 8	0·161 "
No. 4	0·145 "	No. 9	0·165 "
No. 5	0·150 "	No. 10	0·171 "

The mean value is 0·149 per cent.

X. Oleata.—by L. H. Schulmeyer.

Oleate of mercury of the Pharmacopœia is a 10 per cent. solution of the yellow oxide in oleic acid. Solutions of 6 to 20 per cent. are easily made by simply mixing the oxide and acid, and with the aid of a gentle heat combination will soon take place. They will also unite

without heat by simply triturating them together and allowing them to stand with occasional stirring, from one to three days. It has been found, however, that the oleate of mercury is very unstable. It soon deposits metallic mercury on standing; the weaker the solution the more rapid the decomposition.

I have made this oleate from the yellow and also the red oxide of mercury, with and without heat. I found no difference in the keeping qualities or appearance, and both salts are similarly soluble in the acid. Sometimes, however, trouble is experienced in dissolving the yellow oxide, especially when it is old and has been exposed to the light. Of those made with and without heat, I find the latter keep longer. The 5 per cent. and 10 per cent. preparations made with heat began to show signs of decomposition four weeks after being made, while those made without heat were still good and gave no signs of change.

I also made oleate of mercury by double decomposition. The red oxide of mercury was dissolved in excess in dilute nitric acid by boiling, filtering out the solution of mercuric nitrate, and then slowly adding it to a filtered solution of soap with constant stirring. The solution first becomes milky, then a precipitate begins to fall; the mercuric nitrate is added until the solution becomes very nearly clear again, this leaves a slight excess of the soap in solution. The precipitate is now washed with warm water and dried. Thus prepared it is of a light yellow or cream color, very nearly white, of a rather stiff consistence and contains 28 per cent. of oxide of mercury. It keeps very well. A 10 per cent. oleate of mercury made from this differs somewhat in appearance from the other, having a much clearer yellow color, while those that are made by combining the oxide of mercury and oleic acid, have a whitish milky appearance, which I suppose is due to the water formed in the reaction and which remains in the finished oleate.

The oleates made by double decomposition keep very well if carefully made, but the method by direct combination is recommended, as it takes less time and care. The soap solution necessary for making oleates by double decomposition is best made by taking a good quality of oleic acid and adding just enough solution of sodium hydrate to saponify it, the slight excess of sodium hydrate being neutralized with tartaric acid. It is best to use this solution rather dilute, about eight ounces of water to one ounce of oleic acid. The other officinal oleates can best be made by precipitating the soap solution with some soluble salts, as sulphate of copper, acetate of lead, acetate of zinc, etc.

The oleate of arsenic is most likely only a name for a solution of slight traces of arsenic in soap, as I have been unable to make an oleate by the different methods published.

Oleate of veratrine is the only other officinal oleate, and it as well as the other oleates of alkaloids, are easily made by simply dissolving the alkaloids in the acid.

XI. Potassii Bitartras.

Specimens of bitartrate of potassium procured from twelve druggists were submitted for examination (under careful oversight) to members of the junior class.

While the limits of impurity are fixed at a "turbidity" caused by barium and silver salts, few specimens will meet a rigid interpretation of the requirements. Not more than one or two of the twelve samples, however, seemed to have enough sulphate to be called an actual impurity, while only one contained a questionable amount of chloride. The tests for calcium were made in Nessler tubes, resting upon a fine dotted line on white paper; the fluid was considered "cloudy" when the dots were obscured, and "turbid" when printed letters were indistinguishable. With this interpretation of the pharmacopœial test, seven samples were pronounced good, one was fair, and four were questionable. Two samples gave unmistakable reactions for starch.

A thirteenth sample (expressly sold as a cheaper grade) had a decided excess of sulphate and a questionable amount of calcium.

Two samples were also procured from a manufacturer, who offers "pure cream of tartar," in small lots, at 45 cents per pound, and various sophistications, at prices to suit the demand of grocers, down to 14 cents. One of these samples was unobjectionable, except in containing more than the average amount of sulphate and chloride; while the other, on treatment with water, leaves an insoluble residue of calcium sulphate (amounting to 62·4 per cent. after ignition), and the aqueous extract from a weighed quantity neutralized only one-sixth as much alkali as an equal weight of bitartrate of potassium. See further details in *Indiana Pharmacist*, iv, 300 (Feb. 1886).

XII. Potassii Nitras.

A careful examination shows that when genuine saltpetre (nitrate of potassium) is offered for sale, it is practically free from all impurities, except traces of chloride, as indicated by numbers 1 to 8. There are,

however, three spurious preparations sold under the name of commercial saltpetre. Number 9 is essentially nitrate of sodium (sometimes called Chili saltpetre); number 11 is chloride of sodium in angular transparent lumps (or "rock salt"); and number 10 is a mixture of both.

The examination was conducted under my direction by Mr. E. G. Eberhardt and other students of the School of Pharmacy.

REACTIONS OBSERVED.

Reaction with Nitrate of Silver.	
GENUINE.	
No. 1, Opalescence.	These samples were all white powders or colorless translucent lumps, except a yellow tinge in No. 5 and No. 6; solutions of all were neutral to litmus, gave distinct VIOLET color to flame and remained clear on the addition of sulphide of ammonium, carbonate of ammonium, oxalate of ammonium, and chloride of barium. No. 8 was a selected crystal.
No. 2, Precipitate.	
No. 3, Slight Prec.	
No. 4, Slight Opal.	
No. 5, None.	
No. 6, Slight Opal.	
No. 7, Slight Opal.	
No. 8, Slight Preci.	
FALSE.	Solutions of these samples were neutral with litmus, gave bright YELLOW color to the flame, and remained clear on the addition of sulphide and carbonate of ammonium; but chloride of barium and oxalate of calcium showed traces of sulphate of calcium in No. 11, and still more in No. 10.
No. 9, Opalescence.	
No. 10, Heavy Prec.	
No. 11, Heavy Prec.	

Remarks on Genuine Saltpetre.—The eight samples of nitrate of potassium examined, conformed very closely to the requirements of the Pharmacopœia; but two of them had a tinge of color, and four had excess of chloride. Being uncertain whether the reaction of number 1 with silver nitrate exceeds the official limit of "faint opalescence," I had the chloride estimated with decinormal solution of silver nitrate, finding only 0·08 per cent. Number 2, by the same process, contained 0·55 per cent, and number 3, 0·25 per cent. It may be asked whether so small an amount of chloride as 0·5 per cent. can be a practical objection to the use of saltpetre, even for the preparation of diluted nitrate of silver, a considerable proportion of chloride of silver being purposely formed in the preparation of moulded nitrate of silver. The complete purification of saltpetre inevitably adds considerably to its cost of manufacture; but it is desirable that the pharmaceutical profession should either maintain the official standard as nearly as possible, or should express their desires for more latitude through the Committee on Revision of the Pharmacopœia.

The so-called "Commercial Saltpetre."—The wide range of prices among the several brands of genuine saltpetre is insufficient to meet all demands, and venders of horse medicine require a cheaper article to mix with their "black antimony,"[1] etc. Nitrate of sodium (which is largely imported from Chili, as a fertilizer) is naturally suggested as a substitute. The deliquescent character of this salt is well known, making it unfit for ordinary gunpowder. It would probably be unsatisfactory in curing meat, and should not on any account be substituted for nitrate of potassium in filling prescriptions. Number 9 consists of coarse lumps or crystals of this salt, many of them showing plainly in crystalline form that they are not the genuine or "prismatic" saltpetre. Some pieces were white, others were stained on the outside with a reddish tinge, but both kinds were nearly free from chloride.

Number 10 was given to me with the statement that it was merely rock salt, used as a substitute for saltpetre. It proved, however, to contain two distinct materials in coarse lumps mixed together. Some of these, which could easily be distinguished by their similarity to number 9, proved to be nitrate of sodium. After careful washing, these were dissolved, and gave a mere turbidity with nitrate of silver and very slight opalescence with oxalate of ammonium. The other material, which gave no reaction for nitric acid, was chloride of sodium, with traces of sulphate of calcium. Many imperfect crystals were marked by faces meeting at right angles. After careful sampling number 10 was found to contain 75·4 per cent. of chloride.

Number 11 consisted of rock salt alone, with a less proportion of calcium sulphate than the lumps of salt in number 10.

The samples of nitrate of sodium were also tested for iodine with negative results.

Conclusions.—So far as observed, the goods offered as pure saltpetre contain no impurities which are likely to be hurtful, but druggists should be careful to purchase from reliable houses, and never to dispense as saltpetre that which will impart a yellow color to an alcohol flame.

Those who have occasion to use "commercial saltpetre" should note whether it is nitrate or chloride of sodium, or a mixture of both.

[1] See report on Antimonii Sulphidum, above.

Fortunately, these are very readily distinguished by the taste, if only one is present, and the separate lumps may sometimes be distinguished in the mixture. If each article could be sold under its true name, much confusion might be avoided.

XIII. Syrupus Ferri Iodidi.—by E. J. Mowry.

History.—Iodine was discovered by Courtois in 1812, and used in medicine by Dr. Coindet in 1819. Iodide of iron was used by Dr. Pierquin in 1824. Durand (*Journal of Pharmacy* for Jan., 1833) gave his method for preparing "Dr. Jackson's solution of Iodide of Iron," which contained no sugar and was very unstable. The addition of saccharine matter was suggested by Frederking (*Buchner's Repertorium der Pharmacie*, 1839, vol. lxv, p. 370), and experiments were made by Procter (Am. Jour. Phar., April, 1840) upon the use of sugar of milk, manna, cane sugar, honey and uncrystallizable sugar. The first two have little protective power. "Syrup of gum" was used by Dupasquier (*Jour. de Pharmacie*, March, 1841), and simple syrup by Béral (Am. Jour. Phar., April, 1841). It was found impossible to keep solid iodide of iron; Squire recommended the addition of a wire coil to the solution, but a lady patient wanted to know whether the iron screw must be swallowed whole! Thompson succeeded in preserving the iodide in strong syrup, which, he says, may be exposed to air and light, and may be combined with astringent vegetable infusions, etc., or with dilute mineral acids.

T. & H. Smith (Am. Jour. Phar., June, 1847) favored protection from air and light. Tozier (Am. Jour. Phar., Jan., 1853,) and Crew (Am. Jour. Phar., Jan., 1854), give directions for quickly preparing the syrup. Maisch (Am. Jour. Phar., Sept., 1854 and May, 1855), details numerous experiments, showing that the action of light is desirable, if air is excluded, and that oxide of iron, which has been precipitated in aqueous solution, may be again dissolved by the action of sugar in the sunlight.

Groves (*Lond. Phar. Jour.*, March, 1868) proved that dilute phosphoric or sulphuric acid preserves the syrup, and he recommends ½ ounce of the former to 31 ounces of cold syrup.

Squibb (Am. Jour. Phar., March, 1868) restored a discolored syrup by solution of hyposulphite of sodium; 15 to 20 grains were dissolved in an ounce of water, and 15 to 20 minims of this solution were sufficient for 1 pound of syrup not darker than brown sherry

wine. Jeannel (*Jour. de Phar. et de Chim.*, Nov., 1868) recommends tartaric acid for the same purpose.

Rother (*Druggists' Circular*, Dec., 1885) objects to the carbon in iron filings, and insists upon the addition of some sugar to the mixture generating the iodide to prevent the formation of insoluble ferric oxysalts. He also recommends the addition of 120 minims sulphurous acid to 22 fl. ounces of filtered syrup. Robinson (abstract in *Phar. Rec.*, Oct., 1885) found sulphite of sodium, phosphoric acid, phosphorous acid, sulphurous acid and hypophosphites to be unsatisfactory, while the addition of 1 per cent. hypophosphorous acid was sufficient to preserve a solution that was eight times the strength of official syrup, freely exposed to the air for two months.

Preparation.—Dr. Squibb (*Proceedings A. P. A.* for 1873, p. 189) suggests some modifications of the pharmacopœial process of 1870. Following these hints, the writer heats the sugar on a water bath, and filters into it the warm solution of ferrous iodide. As the sugar begins to dissolve, the point of the funnel is lowered into the syrup formed; the sugar is completely dissolved when the filtration is ended. Boiling water is added to make up the required amount, and small vials are completely filled with the hot syrup. The straining of the syrup should be avoided, by the use of pure sugar, clean lumps of cut loaf sugar being preferred.

The experiments, described above, with sulphurous and hypophosphorous acids, to preserve the syrup, have given very satisfactory results; but if pure materials are used, and the syrup is bottled while hot, no protection is needed except good corks.

Commercial Samples.—Maisch (Amer. Jour. Phar., May, 1857) discovered copper in a sample sent him for restoration, and further observed that the iodides of lead, silver and mercury are soluble in syrup of iodide of iron. Shenstone (*Pharm. Jour. Trans.*, April 3, 1875) traced the occurrence of lead to an enameled vessel used in preparation. Tschirner (Amer. Jour. Phar., June, 1875) reports upon the examination of samples purchased in San Francisco, varying in strength from 10 to 46 grains of iodine to the fluid ounce,

The writer has tested thirteen samples as directed by the U. S. P., making duplicate volumetric determinations of strength. Nos. 1–6 were said to be from reputable manufacturers; Nos. 7–12 were made in Lafayette; and No. 13 was made by the writer in the Purdue laboratory.

No. of sample.	Reaction for free iodine.	Per cent. of ferrous iodide.	
1	None.	6·01	
2	Slight.	5·16	
3	Distinct.	5·08	
4	None.	4·37	Mean value, 4·82 per cent.
5	None.	4·04	
6	Slight.	4·26	
7	None.	8·26	
8	None.	8·48	
9	Slight.	8·42	
10	None.	8·30	Mean value, 8·44 per cent.
11	Very slight.	10·24	
12	None.	6·94	
13	None.	10·10	

Nos. 7 and 13 were of a transparent pale green; the rest were either colorless or contained free iodine. The U. S. P. requires 10 per cent. of ferrous iodide; and the data in the table speak for themselves.

XIV. Tinctura Nucis Vomicæ.—by E. J. Yeager.

Variations in strength of the crude drug and of extractive have been clearly shown by Dunstan & Short, A. B. Lyons and Dragendorff, so that assays of total alkaloid instead of extractive, are recommended.

The general plan for separating the alkaloids is as follows: A convenient quantity of tincture or percolate is evaporated nearly to dryness, treated with dilute sulphuric acid, and shaken with chloroform or a mixture of chloroform and ether, to remove a part of the extractive. After separation of the chloroform, the acid solution is washed with successive portions of chloroform or the mixture; it is then made alkaline with ammonium hydrate and treated with successive portions of chloroform or chloroform and ether, to dissolve out the free alkaloids, to be evaporated, dried and weighed in a tared capsule. Dunstan & Short use chloroform throughout the whole process; but Dr. A. B. Lyons (*Druggists' Circular*, Dec., 1885) uses ether for the first two washings of the acid liquid, and one volume of chloroform with three of ether for a third washing; he also treats the alkaline liquid twice with this mixture to extract the alkaloids.

The method of Dunstan & Short was tested (with smaller portions of material and more frequent washing) by comparative experiments

with fluid extract of buchu alone, and with the same quantity of extract to which 0·100 gm. sulphate of strychnine or brucine had been added, representing 0·075 gm. of free alkaloid. Five c.c. of this fluid extract (containing at least as much extractive as 25 c.c. tincture of nux vomica) were evaporated in each case and treated with 15 c.c. chloroform, 15 c.c. dil. sulphuric acid, and 15 c.c. of water. The washing was repeated twice with 15 c.c. of chloroform. After the addition of ammonia, 25 c.c. of chloroform were used to extract the alkaloid, and 15 c.c. for washing. The fluid extract of buchu alone yielded 0·005 gm. of residue by this treatment; hence this amount was deducted from the weights found in the parallel determinations. The mixed fluids were allowed to separate in a glass vessel shaped like a Mohr's burette, the chloroform being drawn off by a pinch cock. The rubber tube proved undesirable, and a glass stop-cock would be recommended for further work. The results are below:—

No. 1.....	·075 gm.	strychnine	taken;	·070 gm. found.
No. 2.....	·075 "	"	"	·065 "
No. 3.....	·075 "	"	"	·065 "
No. 4.....	·075 "	brucine	"	·070 "

While these results are too low, it was thought best to proceed in the same manner with an examination of commercial samples. The alkaloidal residues were dried at 100° C. for one hour. Seven samples of tincture of nux vomica were examined, 25 c.c. being taken for each assay.

No. 1	contained	0·20	per cent.	alkaloid.	
" 2	"	0·36	"	"	
" 3	"	0·31	"	"	
" 4	"	0·13	"	"	Mean value, 0·24 per cent.
" 5	"	0·25	"	"	
" 6	"	0·20	"	"	
" 7	"	0·45	"	"	

No. 7 was prepared by the writer, according to the directions of the U. S. P., and is nearly twice as strong as the mean of the other samples, while Nos. 1–6 show a variation in strength nearly in the ratio of one to three.

A sample of assayed fluid extract from Eli Lilly & Co. was found to contain 1·75 per cent. of alkaloids, as claimed on the wrapper.

Dunstan and Short recommend extraction with a mixture of only 4 parts alcohol to 1 of water, instead of 8 to 1, as in U. S. P.

Bibliographical Note on Nux Vomica.—The British Pharmacopœia having recently adopted a standard based upon alkaloidal strength, it may be a convenience to readers to refer to the following articles in the *Pharm. Jour. and Trans.*, relating to this subject. References are made to volume, page, date, author and topic. The list does not claim to be complete.

XIV 65	July 28, 1883.	*Beckurts.*	Ferrocyanide of Strychnine.
" 290	Oct. 13, "	*Dunstan & Short.*	Separation of Strychnine as Ferrocyanide.
" 292	" "	" "	Tincture of Nux Vomica.
" 380	Nov. 10, "	*Hick.*	Debate on Preparation of Tincture from Fluid Extract.
" 400	Nov. 17, "	*Tanner.*	
" 440	Dec. 1, "	*Hick.*	
" 441	Dec. 8, "	*Dunstan & Short.*	Tincture of Nux Vomica.
" 443	" "	" "	Extract " "
" 450	" "		Discussion of the above papers.
" 461	Dec. 15, "	*Conroy.*	Tincture of Nux Vomica.
" 480	" "	*Sandford.*	Tincture from Fluid Extract.
" 621	Feb. 9, 1884.	*Dunstan & Short.*	Standard Extract of Nux Vomica.
" 622	" "	" "	" Tincture " "
" 634	" "		Discussion of the above papers.
" 851	Apr. 19, "	*Schacht.*	Extract of Nux Vomica and Estimation of Alkaloids.
" 875	Apr. 26, "	*Dunstan.*	Reply to Schacht.
" 876	" "	*Smith.*	" " "
" 896	May 3, "	*Schacht.*	" " Smith.
" 1025	June 21, "	*Dunstan & Short.*	New Glucoside from Nux Vomica.
XV 1	July 5, "	" "	Chemistry and Botany of Ceylon Strychnos.
" 60	July 19, "	*Greenish.*	Seed Hair of Strychnos.
" 156	Aug. 23, "	*Dunstan & Short.*	Summary of Papers.

Physiological Action of Adonidin.—Dr. H. A. Hare gives the following conclusions derived from an experimental study of adonidin:

Adonidin in all doses increases arterial pressure by stimulating the vasomotor centres, and by increasing the cardiac force. In moderate doses it increases the pulse-rate and force from the first, but when large toxic doses are given, it primarily slows the heart by stimulating the pneumogastric, and then increases pulse-rate by depressing the inhibitory nerves, and stimulating the accelerator apparatus. The slowing of pulse-rate is also in all probability due in part to increased arterial pressure, as under these circumstances the blood-paths are greatly diminished in calibre. On the nervous system the drug has but little action, unless the quantity administered be enormous. Under these conditions it paralyzes the sensory side of the cord, but has no effect on the motor tract, or on the efferent or afferent nerve trunks.—*Therapeutic Gazette*, April 15, 1886.

PRACTICAL NOTES AND FORMULAS.

Hydrated Sulphide of Zinc, $ZnS.H_2O$ is precipitated from alkaline solutions of zinc by hydrosulphuric acid or ammonium sulphide, and forms a white powder, which oxidizes slowly on exposure to the air. Taken internally it is decomposed by the gastric juice, causing eructations of hydrogen sulphide. Pierre Vigier (*Gaz. hebdom. méd. chir.*, Feb. 5, 1886) recommends the use of this compound and suggests the following forms:

Pills.—Zinc sulphide, 1·0 gm., liquorice root and syrup of acacia, q. s.; to be made into 100 pills, of which from five to ten are to be taken daily.

Dusting Powder (*stéatite sulfuré*).—Powdered soapstone (steatite), 9 p.; zinc sulphide, 1 p. Useful as an application to excoriations.

Ointment.—Triturate zinc sulphide, 1 p., with expressed oil of almonds, 1 p., and mix with lard (or cerate) 8 parts.

Benzoate of Cocaine is considered by Dr. A. Bignon (*Nouv. Remèdes*, Feb. 15, 1886) superior to other salts of cocaine. The benzoic acid increases the stability of the alkaloid, and its antiseptic properties are of a decided advantage. A solution of the salt may be prepared extemporaneously from 1 part of benzoic acid and 3 parts of cocaine.

Antidysenteric Powder.—Washed sulphur, 1; powdered fennel, 1; sugar, 2; gum arabic, 2. The dose is a teaspoonful every three hours. Schmitjan recommends the powder as being laxative and antiseptic, and useful in subacute and chronic forms of dysentery.—*L' Union Méd.*, Jan 17, 1886.

Pulvis errhinus.—Dr. Rabow recommends in coryza two kinds of snuff powders, composed of equal weights of roasted coffee and white sugar. With 100 parts of this mixture is to be intimately mixed 2 parts of menthol, or 1 part of cocaine hydrochlorate.—*Deutsche Med. Wochenschr.*

Menthol Bougies.—Dr. Rosenberg, of Berlin, recommends the application of gelatin bougies, containing one-sixth grain of menthol, for the relief of reflex neuroses due to nasal disease.—*Weekly Med. Rev.*, April 24, 1866.

Powdered Rice as a Styptic.—According to the *Indian Medical Gazette*, powdered rice is stated to have marked hæmostatic properties. Mixed with lint, in the proportion of from 4 to 11 per cent.,

the lint thus treated being used as a compress, it is more effectual than oxide of zinc, subnitrate of bismuth, salicylic acid, or carbolic acid.—*N. Y. Med. Jour.*, Jan. 16, 1886.

Huchard's Hœmostatic Pills.—Ergotin and quinine sulphate, of each 2·0 gm.; pulverized digitalis and extract of hyoscyamus; of each 0·2 gm. Make 20 pills, of which from five to ten are given during a day.—*L' Union Méd.*

Dentition Syrup.—Dissolve cocaine hydrochlorate and borax, of each 1 part in syrup of marsh-mallow 20 p., and syrup of poppy 10 p. Use three or four times a day on the gums.—*L' Union Med.*

Apone, a remedy for rheumatism, neuralgia, etc., recommended by Dr. V. Poulet, is made by macerating for one month capsicum 200 in alcohol 1,000 and ammonia water 100, and adding to the expressed liquid chloral 10 and oil of thyme 10. For external use it may be diluted with oil. For internal use from 5 to 20 drops are taken with a little water, to be followed by a glassful of cold water or cold tea. —*Bull. Gén. Thérap.*, Feb. 13, 1886.

Administration of Hypnone.—The preparation of a syrup and of an elixir containing a medicinal dose of this new remedy, necessitates the use of a large and objectionable quantity of alcohol. Pierre Vigier recommends for this reason (*Gaz. Hebd.*, Jan. 22, 1886) the administration in the form of an emulsion, as follows:

Mixture of Hypnone.—Take of hypnone, 20 drops; expressed oil of almond, 10 gm.; gum arabic, 10 gm.; syrup of orange flowers, 60 gm.; water, 120 gm. Of this emulsion one-fourth, one-third, or even one-half is taken at a dose, representing respectively five, seven, or ten drops of hypnone. The mixture keeps well and has a pleasant taste.

Liniment of Hypnone consists of equal quantities of hypnone and expressed oil of almond. This is superior to liniments containing chloroform, which evaporates so readily, while hypnone remains in contact with the skin for a much longer time, its boiling point being 199° C.

Kefir or Milk Wine.—Kogelmann, of Graz, has shown that the imported kefir-fungus is not necessary for the production of milk wine. The same ferment is abundantly present in buttermilk and also in cream which has become strongly sour. Kogelmann gives the following directions for the preparation of kefir: One part of buttermilk is added to two parts of fresh milk. Active fermentation sets in within a few hours, and in three days there is obtained a fluid

which has the odor of wine, and which contains alcohol, carbonic acid, lactic acid, casein, etc., and which is identical with the imported kefir. The range of temperature within which the fermentation occurs is between 48° and 70° F., the best results being obtained at 59° F. The bottle used should be strong and should be but two-thirds filled. It must be at least thrice daily corked and vigorously shaken, then opened and laid for ten minutes as nearly horizontal as practicable, in order that the carbonic acid evolved shall escape, for fermentation is checked in the presence of an excess of gas. One part of the resultant kefir is sufficient to induce the appropriate fermentation in four parts of fresh milk.—*Med. News*, May 1, 1886.

Salicylated Gelatin.—Salicylic acid, 10; glycerin, 10; gelatin, 30; water 30. Dissolve by the aid of heat. It is recommended by Dr. Schwimmer in vesicular eczema.—*Wien. Med. Presse.*

Glycerite of Alum.—Dissolve with the aid of a gentle heat 1 part of alum in 5 parts of glycerin. Dr. R. W. Parker recommends this as a powerful astringent, less disagreeable than tannin, and quite compatible with iron salts. This preparation has been admitted into the new British Pharmacopœia; likewise the following:

Glycerite of Subacetate of Lead.—Take of acetate of lead, 5 oz.; oxide of lead in powder, $3\frac{1}{2}$ oz.; glycerin, 1 pint (imperial); distilled water, 12 fluid ounces. Mix, boil for a quarter of an hour, filter and evaporate until the water is dissipated.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

The Histology of Indian Sandal Wood has been investigated by Wm. Kirkby, F. R. M. S. The wood, which is the undoubted produce of Santalum album, is heavy and hard, but splits comparatively easy. It is reddish brown, darker at the centre than at the periphery, and is marked with darker concentric zones. With a lens, the medullary rays and wide vessels are fairly well seen. The taste is aromatic, and the agreeable odor characteristic and persistent. The wood consists of tracheides, interspersed with solitary pitted vessels, and traversed by narrow medullary rays (Fig. 1). The wood wedges vary in breadth from 25 to 294 micromm., the average being 145 micromm. The

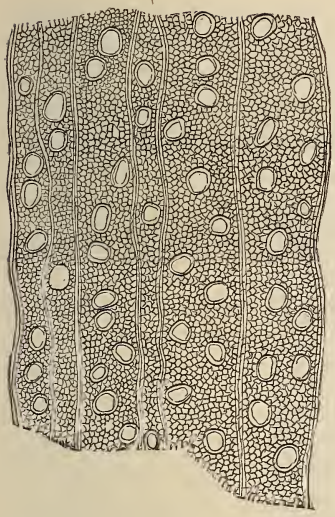


Fig. 1.—Macassar Sandal Wood:—Transverse Section of Duramen. X. 64.

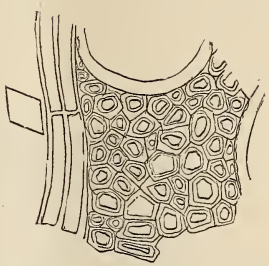


Fig. 2.—Showing Crystal and Parenchymatous Oil Cells. X. 320.

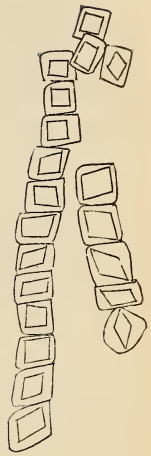


Fig. 3.—Crystal, containing Sacs, and Crystals dissolved out with Schulze's Fluid. X. 220.

vessels measure from 42 to 84, average 54 micromm. Among the tracheides are parenchymatous cells (Fig. 2), having about the same diameter as the former, and containing the volatile oil; they are isolated, but two or three are close together. Cells containing crystals of calcium oxalate are arranged in vertical rows (Fig. 3), and seen single in transverse section. The medullary rays consist of two rows of thickened pitted cells, and contain resin.

Macassar Sandal Wood is lighter than water, cuts with difficulty transversely, but cleaves easily. The heart wood is pale fawn colored or yellowish brown, with darker concentric zones, less strongly odorous than the preceding, and of an aromatic taste. Its histological structure is the same as the preceding, except that the wood wedges have an average breadth of 124 micromm., and the vessels an average diameter of 48 micromm. When sections of the wood are treated with solution of iodine, the volatile oil acquires an intense black color, such a color being not produced with Indian sandal wood oil. It is uncertain whether Macassar sandal wood is derived from Santalum album.

West Indian Sandal Wood.—The specimen examined by Mr. Kirkby was a section of a stem 57 mm. in diameter, the bark being 1 mm. thick; duramen (including pith, 1 mm.) 27 mm. in diameter; average

thickness of alburnum, 14 mm. Color of bark, grayish brown; alburnum yellow with yellowish brown zones; heart wood yellowish-brownish gray, and in the centre yellowish-grayish-brown; pith a light dot in the centre. The bark adheres closely to the wood, which is moderately hard, faintly odorous, and nearly tasteless, while the bark has an

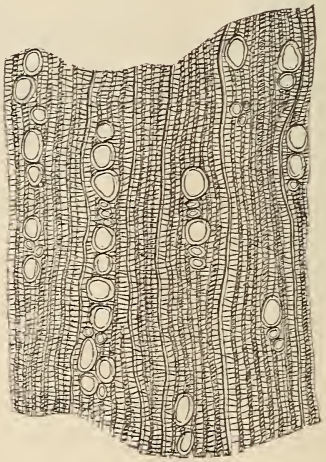


Fig. 4.—West Indian Sandal Wood. Transverse Section. X. 80.

odor resembling sandal, and a bitterish taste. The wood (Fig. 4) consists of xylem fibres, pitted vessels, and one-rowed medullary rays, the cells of which are thickened, tabular, and in the duramen, contain resin. The vessels vary greatly in size, and are usually in single radial rows of two to ten or more. Crystals of calcium oxalate are arranged in single vertical rows, and on transverse section, form usually loose concentric rings, each ring corresponding to one year's growth of the tree. The medulla cells are irregular hexagonal, thickened and pitted. No essential oil is present in the wood. Freed from cork, the bark is light red brown, and internally pale brown. Outside the narrow layer of cambium is a layer of soft bast tissue, made up of the usual elements. Next is a broad layer containing numerous bast fibres in loose layers, alternating with layers of soft bast tissue. Both these tissue systems contain numerous isolated oil cells, having a large diameter, and extended in a vertical direction. In about the middle of the outer cortical parenchyma is situated a layer of three or four tangentially extended sclerenchymatous cells, and isolated groups of stone cells are found

scattered in the parenchyma. Two or three inner rows of the cork cells have colorless cell walls, the remainder brownish red. The average thickness of the soft bast layer is 100 micromm.; mixed bast layer, 500; cortical parenchyma, 200 (including layer of stone cells, 50), and cork, 200 micromm.

The West Indian Sandal Wood is not yielded by a sandal tree, its structure being entirely different. The Macassar wood is probably produced by a different species, or at least a distinct variety of *S. album*, since the woods of other santalaceæ differ to scarcely any greater extent in structure, but exhibit no such peculiarity in the behavior of the oil towards iodine.—*Phar. Jour. and Trans.*, April 10, 1886, pp. 858–860.

Oil of Myrtus communis is now discussed in medical journals under the name of *Myrtol*, with reference to the observations made by Dr. Linarix and published in Paris, 1878, under the title of "De l'emploi du myrtol ou essense de myrte principalement dans les maladies des voies respiratoires et génito-urinaires." The oil has antiseptic and disinfecting properties, does not irritate the unabraded skin, is a digestive stimulant, and, in large doses, produces nausea and headache, at the same time a violet-like odor being observed in the breath and in the urine. It is given in gelatin capsules containing 0.15 gm. of the oil, about 6 doses being taken during the day. The oil is recommended in various forms of catarrh, and as an antiseptic in certain putrid discharges; externally, also, in rheumatism and psoriasis.

Anisic acid has been recommended as an antiseptic application for sores, and as an antipyretic remedy which resembles salicylic acid in its action and has slightly toxic effects. The acid is an oxidation product of anethol, and may be prepared from oil of anise and other volatile oils containing anethol by oxidation with nitric acid, or with potassium bichromate. Zervas recommended its preparation from 6 parts of the bichromate, 9 of water, and 7 of sulphuric acid, to which mixture 1 part of anise oil is added; after the reaction has subsided cold water is added, and the acid is purified by recrystallization.

Anisic acid has the formula $C_8H_8O_3$, crystallizes in colorless, glossy, needles or rhombic prisms, is inodorous, has a slight taste and an acid reaction, and dissolves in alcohol, ether and hot water, crystallizing from the latter solution on cooling. It melts at 175°C, and volatilizes at a higher temperature. Its alkali and ferrous salts are insoluble in water; most of the other salts are sparingly soluble and may be

obtained in crystals by double decomposition in sufficiently diluted solutions. Schultzen and Graebe ascertained, in 1867, that in the animal economy, anisic acid forms *anisuric acid*, $C_{10}H_{11}NO_4$, which is a substitution product of glycocoll.

Ammi Visnaga, Lin. is an annual or biennial umbelliferous plant, indigenous to the countries near the Mediterranean. The plant, and, more particularly, the fruit, has long been in use, diuretic and emmenagogue properties being ascribed to it. The numerous rays of the umbels finally become quite hard, and possessing an aromatic flavor, are used in oriental countries as tooth picks. The Arabian name of the plant is *el kellah.* Ibrahim Mustapha (*Compt. rend.*, Aug. 25, 1879), isolated from the fruit an emetic and narcotic principle, which he named *kellin;* it is obtained by mixing the powdered fruit with slaked lime and alcohol, evaporating to dryness and exhausting with ether. Kellin forms white, silky needles, which are sparingly soluble in cold water. Recently attention has again been directed to this plant in French journals (*L' Union Méd.*, April 8, 1886). Kellin is stated to produce in animals paralysis of the hind legs, irregularity of heart action and slow breathing. An infusion of the fruit, 5 or 6 : 100, is used as a mouth-wash in inflammations and carious teeth, and a decoction, 10 : 1000, is given internally for rheumatism, from 125 to 150 gm. being taken daily; an ointment made with the powdered fruit being used externally. The decoction is also stated to possess mild antipyretic properties, and to be useful in calculi of uric acid. The leaves, which are used for poultices, are decompound, the final lobes being linear, cuspidate and divaricate.

Ailanthus leaves poisonous.—Caraven-Cachin has observed that ducks fed with ailanthus leaves, died in a few hours, and attributes this effect to a poisonous principle residing in the very acrid juice. —*Jour. Phar. Chim.*, Dec., 1885.

Ambrosia artemisiæfolia, Lin.—Attention has been directed to this common plant, known as ragweed, in the *North Car. Med. Jour.*, by Dr. J. H. Hill, who found it very serviceable in persistent bleeding of the nose, a strong infusion of the plant being given in tablespoonful doses every half-hour, and a plug made of the leaves being inserted into the nostril. According to the National Dispensatory, the astringency of the plant has caused it to be used in moderate discharges of blood and mucus, and to palliate mercurial salivation.

Galium Aparine, Lin., nat. ord. Rubiaceæ, commonly known as

cleavers and *goosegrass*, is a common weed found in hedges and thickets in North America, Europe and Asia. Its weak quadrangular stem is retrorsely prickly, about 2 to 4 feet long, and reclines upon other plants; the linear-lanceolate leaves are in whorls of eight, tapering at the base, and rough on the margin and mid-ribs; the small, white flowers are produced from May to September, and ripen a subglobular twin fruit, which is covered with hooked prickles. The plant was formerly employed as a diuretic, in dropsy and in pectoral complaints. Recently Dr. T. R. Orwin (*Brit. Med. Jour.*), reported its successful employment in a case of psoriasis, which had not yielded to chrysarobin, tar or arsenic. The plant was applied in the form of poultice and was internally given in infusion.

Danais fragrans, *Commerson*, nat. ord. Rubiaceae, is a climbing shrub of Réunion, Madagascar and other islands, with small, red, fragrant flowers. A decoction of the root has been used in herpetic affections, and as a tonic and febrifuge; and the bright orange-colored juice, which the fresh root exudes, has been used as a dye, and medicinally, as an application to wounds, causing rapid cicatrization. Bourdon has isolated from the root an alkaloid called *danaïdine;* but the medicinally active principle is *danaïne*, as reported by Heckel and Schlagdenhauffen to the Académie française.

Mercurialis perennis, *Lin.*, nat. ord. Euphorbiaceæ, was formerly employed in medicine, like the less active Merc. annua, *Lin.* In 1863 E. Reichardt isolated from both plants the volatile alkaloid *mercurialine*, which, in 1877, was ascertained by E. Schmidt to be identical with monomethylamine; besides which, also, ammonium salts and trifling quantities of trimethylamine are present. The alkaloid in the form of hydrochlorate, and administered by hypodermic injection, was recently found by Dr. Hugo Schulz (Arch. f. experim. Pathol. u. Pharmak., 1886, p. 88), to produce no decided effect; but the herb, as well as the fluid extract, given to pigs and rabbits caused paralysis of the muscles of the bladder with diuresis and diarrhœa. The plant is known to contain a chromogene yielding a blue coloring matter resembling indigo. Whether the physiological action of the plant is due to this principle, as Dr. Schulz believes, or to some other compound, has not been established.

Polygonum aviculare, *Lin.*, popularly known as *knotgrass* or *goosegrass*, is a common annual weed, growing in cultivated and uncultivated grounds in most countries. The thin stem is prostrate

or sometimes erect, much branched, the branches ascending, the leaves small and varying in shape, and the akenes triangular, blackish, dull, granular and enclosed in the small sessile calyx. The herb is inodorous and has a slight astringent taste. It was recommended by Dioscorides and Plinius as a remedy in fevers, and was subsequently employed in diarrhœas, hemorrhages and as a vulnerary. Recently it has been recommended by Dr. Roschtschinin, of St. Petersburg, in bronchial catarrh, asthma and whooping cough, an infusion 30 : 1000 being given in doses of a glassful three times a day. Werner is said to have observed considerable quantities of an alkaloid in the plant. A. Buchner, in 1844, found the plant to be free from tannin, and the infusion made with diluted acetic acid, to give a white flocculent precipitate with tannin, which was attributed to the presence of albumen; the same infusion neutralized with ammonia acquired a bright yellow color.

Prof. Falconi, of Cagliari, has successfully used the same plant in the initial stage of cholera, giving a decoction prepared from 100 gm. of the herb with 400 gm. of water.

Phormium tenax, Forster, nat. ord. Liliaceæ, yields the so-called New-Zealand hemp, and is also regarded as a good substitute for sarsaparilla. Dr. F. A. Monckton, in the *Lancet,* reports it to be very useful for producing healthy granulations in cases of severe larcerations and amputation. A strong decoction is used, made by boiling the roots and the butts of the leaves for twelve hours, and to prevent fermentation, which readily sets in, half an ounce each of carbolic acid and of glycerin is added to a quart of the decoction.

Snake-poison.—Dr. R. Norris Wolfenden read a paper before the Royal Society, December 17, 1885, in which he demonstrated that the venom of the East Indian cobra (Naja tripudians, *Merr.*) does not contain any alkaloid or poisonous acid, but that its poisonous properties reside in the albuminous constituents, and that, with the removal of the latter or their destruction by means of potassium permanganate, the poisonous properties disappear. The venom contains three varieties of albumins. Two of them, globulin, which is in largest quantity, and syntonin, act upon the respiratory centre; while the third, serum-albumin, which exists only in very small quantities, probably produces paralysis of the motor centres. Whether the poisonous properties of these albumins are due to some peculiarity of their constitution, or whether some hypothetical poison is linked with albumins of ordinary

constitution, has not been ascertained; but the possibility of the proteids of the venom being themselves poisonous, is rendered more probable by the observations of Schmidt-Mühlheim and Albertoni, who have shown that ordinary peptone, injected into the blood, may produce poisonous effects, causing a remarkable fall in blood-pressure, and destroying the coagulating power of the blood.—*British Medical Journal*, Jan. 9, 1886.

NOTE ON A NEW VARIETY OF RHATANY.[1]

By E. M. Holmes, F. L. S.,

Curator of the Museum of the Pharmaceutical Society.

The three varieties of rhatany which have hitherto appeared in the London market have been respectively described under the names of Peruvian, or Payta rhatany; Savanilla, or New Granada rhatany; and Pará, or Ceará rhatany. These have been referred to the following species: *Krameria triandra*, Ruiz and Pavon; *K. tomentosa*, St. Hil.; and *Krameria argentea*, Mart. The other species of *Krameria* which furnish a rhatany, but the roots of which have not as yet been offered in commerce in this country, are *Krameria lanceolata*, Torr., a native of North America; *K. secundiflora*, DC., of Texas, Mexico, and Arkansas; *K. spartioides*, of New Granada; *Krameria acida*, Bg., of Venezuela; and *Krameria cistoidea*, of Chili.

The rhatany at present under consideration does not come from any of the above-mentioned countries, having been imported from Guayaquil, in Ecuador, a country to which the Peruvian rhatany might possibly be supposed to extend on the one side, and the New Granadian species on the other.

The latter kind I have not seen, but the Guayaquil rhatany differs considerably from the Peruvian root, and possesses the following characters: It is a large woody root, from 1 to 2 inches, or more, in diameter in the larger specimens, and about $\frac{1}{2}$ inch in the smaller roots. All the pieces I have seen are strongly contorted. The bark is of a reddish-brown color, with blackish streaks, is thin in comparison to the meditullium, is of a fibrous texture, and is somewhat striated on the surface and dotted over with small warts. It has a very astringent taste, but no marked odor.

[1] Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, April 14th, 1886.

I do not think it probable that this root is derived from the species used in New Granada, viz., *Krameria spartioides*, since all the known species of *Krameria*, so far as I have been able to ascertain, are either herbaceous plants or under-shrubs, whilst the root under consideration resembles more nearly that of a large shrub or small tree.

From a preliminary examination of the microscopic structure of the root, I have reason to believe that the plant yielding it, although probably not a *Krameria*, may belong to a genus nearly allied. A more careful and detailed examination of the microscopic structure may perhaps throw more light upon this point. Meanwhile the introduction of the drug into the London market, under the name of rhatany, renders a chemical examination of its properties desirable. The taste of the root being remarkably astringent, it occurred to me that some indication of its value as an astringent might be obtained by a comparison with the other commercial species of rhatany in respect to the amounts of tannin afforded by them. Dr. B. H. Paul kindly undertook to make the comparison, and has communicated to me the following results, obtained in his laboratory by Mr. F. W. Passmore: Taking a quantity of the bark only, of the root of the Guayaquil rhatany, sufficient to yield 100 parts of tannin, a similar quantity of the root, including both bark and wood, of Peruvian rhatany, yielded only 37·6 parts of tannin; Guayaquil rhatany, 41·3 parts; Pará rhatany, 45·7 parts; Savanilla rhatany, 49·3 parts. The proportion of tannin contained in the bark alone of the Guayaquil rhatany is therefore relatively more than twice as much as that contained in Savanilla rhatany root. Although the amount of tannin is apparently greater both in the Savanilla and Pará rhatany than in the Guayaquil variety, it must be borne in mind that the proportion of the wood to the bark is much greater in the latter, being 62 per cent. of wood to 38 per cent. of bark in the specimen of Guayaquil rhatany examined by Dr. Paul.

It is thus evident that the Guayaquil rhatany contains a larger quantity of tannin than the Peruvian drug, but less than either the Savanilla or Pará varieties, the separated bark of the Guayaquil root being, however, more than twice as rich in tannin as either of those roots.

It may here be worth while to mention the fact that the Savanilla rhatany root which is at present in the London market is identical with that described in "Pharmacographia" as Pará rhatany, this fact

having probably led to the erroneous description of Savanilla rhatany in the Pharmacopœia, where it is stated to be of a dark purplish or violet color, whereas Savanilla rhatany has a pale or dull purplish-brown tint. The latter is the kind referred to in Dr. Paul's analysis.

The Guayaquil rhatany, therefore, evidently possesses powerfully astringent properties, and might be made available for tooth tinctures, and might possibly be turned to account in tanning.

I may take this opportunity of acknowledging my indebtedness to Messrs. Jenkin and Phillips, who have kindly presented specimens of the root to the Museum of this Society, together with a sufficient quantity for the chemical examination made by Dr. Paul. Mr. Philips informs me that this kind of rhatany appeared in the London market for the first time this month, and that only four bales of it were offered. —*Phar. Jour. and Trans.*, April 17, p. 878.

EUCALYPTUS PRODUCTS.

(Concluded from page 183.)

Eucalyptus Kino.—An astringent exudation occurs in most species of eucalyptus, filling cavities or cracks in the wood and barks; when dry it is brittle and presents an appearance similar to Indian kino. It varies greatly in different species, both in quantity and in character. According to Wiesner it consists of a mixture of tannic acid, giving a dirty green precipitate with solutions of ferric salts, pyrocatechin, a little catechin, and a very variable quantity of a substance insoluble in water, but soluble in alcohol, and which has been variously described as gum resin, kino-red, or eucalyptus-red.

The amount of the astringent exudation afforded by different species may be seen from the following table :

	Per cent.	Per cent.
E. leucoxylon	21·94	
E. macrorhyncha	11·12 to	13·41
E. longifolia	8·3	
E. rostrata	8·22	
E. viminalis	4·88 to	5·97
E. globulus	4·84 to	5·97
E. resinifera	4·38	
E. goniocalyx	4·12 to	4·62
E. melliodora	4·03	
E. obliqua	2·50 to	4·19
E. polyanthema	3·97	
E. Gunnii	3·44	
E. amygdalina	3·22 to	3·40

The relative quantity of kino-red present in the tree appears to determine in great measure the value of its timber, as it renders the wood almost impervious to decay when under water, and prevents the attacks of insects and marine animals. The species in which it is most largely present contain from 17 to 19 per cent., as in *E. marginata*, *E. rostrata* and *E. robusta*, which are the most valuable of the timber trees of Australia for shipbuilding, piles and similar purposes. The kino of *E. resinifera* also contains a quantity of kino-red, only one-sixth of it being soluble in water. It is to this last-named species that Botany Bay kino has generally been attributed; but Sir F. von Mueller states on the authority of the Rev. Dr. Woolls that it is much more extensively collected from *E. siderophloia*, to which, indeed, the name of *E. resinifera* has been applied by Allan Cunningham.

Several species yield a kino containing but little kino-red, and consequently dissolving readily in hot water, although forming a turbid solution when cold.

Those of the following species have been examined by Wiesner:[1] *E. globulus*, *E. leucoxylon*, *E. citriodora*, *E. amygdalina*, *E. pilularis* and *E. fissilis*.

There is great difficulty in ascertaining the exact botanical source of the eucalyptus kinos at present imported into this country, partly owing to the same name being applied to distinct trees in different parts of Australia. Thus the name of red gum, under which name a eucalyptus kino is employed in this country, is applied to *E. rostrata*, *E. tereticornis*, and in West Australia to *E. calophylla*. The first two of these yield a kino only partially soluble in water, while that of *E. calophylla* is easily soluble, and contains but little kino-red. This species is said by Mueller to afford a liquid kino in considerable quantity by tapping the trunk. It is caught in casks as a material for tanning and dyeing purposes, and is said to fetch £20 to £25 per ton in the London market. It indurates on exposure to the air, and can then be used in medicine internally, like true kino, or in powder, as an application to wounds. Two species which yield a kino perfectly soluble in water are *E. obliqua* and *E. piperita*. That of the former resembles Indian kino in appearance, and forms a deep-red neutral solution; the latter is of a zircon-red color, is

[1] See *Pharm. Journal* [3], ii, p. 102.

translucent, and forms a yellowish-red, neutral solution. The tannic acid of *E. obliqua* differs from that of most other species in giving a dark violet precipitate with solutions of ferric salts. The number of these inspissated juices suitable for replacing true kino in pharmacy is therefore very limited. A great deal of other interesting matter is contained in "Eucalyptographia," under different species, such as the use of the acid sap of *E. Gunnii* to form a kind of cider, the employment of the roots of *E. microtheca*, *E. oleosa*, and *E. populifolia* as a source of drinking water in the desert land where they flourish, the manna of *E. viminalis*, and the value of the rugged barked variety of *E. leucoxylon* as an indication of gold-bearing soil. Much of interest for the botanist will be found in the details concerning the development of the seedling plants and the structure of fruit, leaf, flower, wood and bark; but these have no practical bearings for pure pharmacy.—*Phar. Jour. and Trans.*, April 24, 1886.

SHELLAC.

By J. Bosisto,

Examiner in Materia Medica at the College of Pharmacy, Melbourne.

In the central province of India, especially in the thick jungles, the coccus lacca insect may be seen dwelling together in thick set groups on the branches and twigs of Zizyphus jujuba, Ficus religiosa, Butea frondosa, besides other trees and shrubs belonging chiefly to the leguminosæ order. Each insect incrusts itself over with a resinous substance, forming within a cell containing larvæ and a deep coloring matter, the dead body of the parent being itself the cell. Hundreds of these are piled together adhering to a twig, and in this condition it is termed stick-lac, and contains about 70 per cent. of resin, 10 per cent. of coloring matter, and the rest *debris*.

The collecting of stick-lac and the making of shellac, button-lac, sheet-lac and lac dye, is an industry carried on by the Hindoos in the districts of the central provinces. In order to obtain the largest quantity both of resin and coloring matter, the stick-lac is collected before the larvæ emerge from the cells, else, with their flight, they carry away the greater part of the dye coloring.

Since the advent of the aniline dyes, lac dye is but little in demand. The larva is allowed to mature, as it does not interfere with the quality or quantity of the resin portion. It is chiefly this circumstance that

keeps down the price of shellac, there being, consequently, more insect workers than formerly.

The process of dealing with stick-lac for the making of shellac and lac dye was witnessed by the writer when in India, and is as follows :— The first part of the process is to separate the lac from the twigs. This is done by two women—one turning and the other feeding a primitive-shaped wooden mill. When a heap is formed (about a bushel in quantity), it is winnowed in a rustic-looking winnower, the lighter *debris* separating; the remainder is then hand-picked. The process of grinding and winnowing is repeated until the whole is reduced to small, orange-colored nodules. When in this condition it is termed seed-lac; the bright garnet-colored pieces, being few in number, are now picked out and set aside for native ornaments. The seed-lac is then placed into a large earthenware pan, and with it some water. A woman steps into the pan, steadying herself against the mud wall with her hands, then turning violently to the right and left, in order to keep the lac in a continual state of motion against her feet and the sides of the pan for some time, the other woman occasionally adding more water, until the vessel is full of a dark-colored liquid. After settlement, the dye water is removed into another earthenware pan, and the lac again washed until the water runs away clear.

Lac Dye.—The treatment of the colored water for the purpose of obtaining from it the lac dye is very simple. After straining, lime water is added which precipitates the dye. The water is then drawn off, and the dye drained through cotton cloth; from this it is transferred to compressible frames, containing strong iron plates, and reduced by a native screw press to solid sheets of dark purple dye, about a quarter of an inch thick; these are cut up into cakes and stored until dry enough for packing, and then forwarded to Calcutta for sale in the bazaars. The utilitarian value of lac dye over cochineal in a humid climate, especially in dyeing the scarlet cloth of the soldiers' coats, lies in its power to resist the action of human perspiration.

Shellac.—The manufacture of shellac is an entirely distinct process. The seed-lac at the bottom of the pan is removed, dried and sifted. The finer dust, which is highly inflammable, is removed. The lac workers of India make it up into bracelets and ornaments of various kinds.

The coarse lac which is to be made into shell is put into long sausage-shaped bags of about two inches diameter, made of cloth like American

drill. Under a shed is a charcoal fire about two feet long and six inches wide; alongside of the fireplace is a bamboo pole about three feet long and four inches in diameter, filled with warm sand, inclining at a slight angle to the ground. On each side of the fireplace is sitting a man, but more generally a woman, each holding an end of the sausage-roll-looking bag about twelve inches high over the clear charcoal fire, turning the roll or bag briskly until the lac begins to ooze through the interstices of the cloth; the bag is still kept twisted until a coating of soft lac covers the outside. It is then removed from the fire, and a small disc of lac is placed here and there over the surface of the bamboo by a rapid turn of the wrist. A third woman is sitting at one end of the bamboo, holding in both hands a strip of aloe leaf, resembling very much a thin magic wand; this she pushes forward over the soft lac, repeating the motion three or four times, when a thin film of the lac covers over the round surface of the bamboo, which is immediately transferred into an open basket; the lac, drying rapidly, cracks up into many pieces—this is shellac.

Button-lac is simply shellac without spreading.

Sheet-lac is made in a similar manner to shellac, only the sheets are much thicker, and the woman removing it from the bamboo in a supple condition, and with both hands, stretches it over the fire, in order to remove the wave-like furrows which are impressed on it by the fibrous surface of the aloe leaf. While doing this it is not uncommon to see the woman—who performs her work intelligently—lift the hot sheet to her mouth and bite out any foreign substance, such as dirt or sand, filling in the hole so made by a rapid movement of her hand over the sheet. The average rate of wages is an anna and a quarter ($1\frac{1}{8}$ of a penny) per day.—*Australas. Jour. Phar.*, 1886, p. 49.

COCAINE BENZOATE.

By B. H. Paul, Ph.D.

In *The Month*, for February, reference was made to an article by M. Bignon on cocaine benzoate, in which the salt was recommended as being likely, in the author's opinion, to possess more pronounced anæsthetic properties than any other salt of cocaine. It was considered that the compound of cocaine with benzoic acid would be more stable than the hydrochlorate, and in a trial of the benzoate it was found to produce the anæsthetic effect without the painful sensation

that accompanies the use of the hydrochlorate. Since the appearance of the article referred to in *Nouveaux Remèdes*, there has been some demand for cocaine benzoate, but it appears that the principal makers of cocaine have declined to supply. the salt, and it became necessary for those who required it to undertake the preparation of it themselves. According to the account given by M. Bignon, the benzoate is easily obtainable by mixing cocaine with benzoic acid to neutralization, the proportions being 122 to 303, or about one part of benzoic acid to three parts of cocaine. M. Bignon does not, however, give any description of the characters of the benzoate as a definite compound, but merely the mode of preparing a solution containing 5 per cent. of it. On a former occasion I had attempted to prepare this salt, but did not succeed in obtaining it in a crystalline condition, the solution obtained by neutralizing cocaine with benzoic acid drying upon evaporation to a thick gummy residue.[1]

An article has, however, been supplied lately by a French manufacturer, under the designation of cocaine benzoate, which is in the form of a light crystalline powder, not very readily soluble in cold water, but dissolving at once, on the application of a gentle heat, in about thirty parts of water, and on evaporation of this solution yielding a mass of delicate acicular crystals. Not having been able myself to obtain any product of this character by the combination of cocaine with benzoic acid, I undertook the examination of the substance in question, which was supplied to me by Mr. Martindale, who had also been endeavoring to prepare cocaine benzoate in a condition suitable for medical use. I found, however, that the solution of the substance obtained from Paris, under the name of cocaine benzoate, did not give any precipitate on the addition of ammonia or caustic potash, neither did it present any indication of containing benzoic acid on the addition of hydrochloric acid. Judging from these two tests, therefore, it did not appear to contain either cocaine or benzoic acid; at any rate enough to be separable in that way from a solution containing one part of the substance in thirty of water. Another reason for doubting that this substance was a cocaine salt was the observation that its anæsthetic property is at most very slight. This point has been ascertained by Dr. Tweedy by the application of a solution (one part in thirty) to the eye.

I therefore prepared some cocaine benzoate by saturating the base with benzoic acid for the purpose of comparison. I found that on

[1] See *Pharm. Journal*, October 17, 1885, p. 326.

mixing the two substances in suitable proportions with only a drop or two of water they readily combined, forming a thick liquid which dried up on exposure to a surface of oil of vitrol to a gummy mass, and after some days' exposure in a cold place it presented a crystalline structure. Several products which Mr. Martindale had sent to me had the same characters, and on redissolving these in about their own weight of moderately warm water, solutions were obtained which gave on cooling and after standing some time, acicular crystals quite different, however, from those obtained from a solution of the "cocaine benzoate" procured from Paris. A solution of these crystals gave with ammonia and hydrochloric acid the precipitates characteristic of cocaine and benzoic acid salts, in both respects, therefore, differing from the French article.

It was clear therefore that cocaine benzoate could be obtained in a definite crystalline condition, though a very soluble salt, and it was also clear that the article obtained from Paris, under that name, was of a different nature. A further examination of this latter substance enabled me to ascertain that it was in reality the same substance that I have previously described[1] as being produced by the action of water and heat upon cocaine—benzoyl ecgonine—and it became a question how this substance could have been taken for cocaine benzoate. In seeking for a solution of this problem I tried the effect of rapidly evaporating an aqueous solution of cocaine benzoate thinking that the benzoic acid might thus be driven off and the decomposition of the cocaine by heat and water brought about at the same time. But this was not the case, and I was equally unsuccessful when a solution of cocaine benzoate in spirit was rapidly evaporated. In both cases the residue left was cocaine benzoate, which after some time showed signs of becoming crystalline. Considering the source from which this article had been obtained there seemed to be every reason to suppose that it had been produced as the result of some unobserved alteration that had taken p'ace in the attempt to prepare a true cocaine benzoate, and it remains to be determined how this change took place. For this purpose I have some experiments still in progress, and have received some information bearing on the point from the manufacturer of the article supplied from Paris.

I may take this opportunity of supplementing the account I formerly gave of the benzoyl ecgonine obtained by heating cocaine with

[1] *Ibid.*, p. 325.

water. It may be easily produced by heating cocaine with about twenty parts of water in a closed tube. At first the cocaine melts when the temperature is about 90° C., but it gradually dissolves on maintaining the heat at 100° C., while bubbles of gas or vapour escape from the mass. The change is facilitated by occasionally shaking the tube so as to distribute the melted cocaine through the water in globules and thus extend the surface of contact. After about twelve hours a perfectly clear solution is obtained, and on testing this with litmus paper it has only a very faint acid reaction if the cocaine used has been purified by recrystallization from alcohol. With impure cocaine, on the contrary, the acid reaction of the liquid is often very decided. By evaporating the liquid to a small bulk the benzoyl ecgonine crystallizes in needles, closely resembling ammonium oxalate. These crystals when dried by exposure to the air retain some combined water, and they melt when heated; but when dried over oil of vitrol they become opaque and then no longer melt when heated in the water-bath. In my former paper it was stated that I could not then succeed in obtaining benzoic acid from this substance by heating it with concentrated hydrochloric acid, and this was due to the very small quantity of material I had to deal with, less than half a gram. I now find that it does yield benzoic acid when heated with strong hydrochloric acid, as well as by the action of caustic soda.

It will be interesting to observe the difference in the physiological action of this substance as compared with cocaine. So far as the trials already made determine this point, benzoyl ecgonine does not appear to have much, if any, anæsthetic effect when applied to the eye, or to produce any appreciable result beyond a little, but decided, dilatation of the pupil. Chemically this substance differs from cocaine only by CH_2, or in other words, it is cocaine in which a methyl group (CH_3) has been replaced by hydrogen.—*Phar. Jour. and Trans.*, March 27, 1886, p. 817.

SACCHARIN.

Under the name of saccharin, a substance has recently attracted notice, both in Europe and in America, that seems destined to play no small rôle commercially, and it may be also therapeutically.[1]

[1] Fahlberg. "Saccharine."—*American Chemical Journal*, Vol. I., p. 170., Vol. II., p. 181, and Fahlberg and Remsen, Vol. I., p. 426.

V. Aducco e U. Mosso. "Esperienze fisiologiche intorno all'azione della sulfinide benzoica o saccarina di Fahlberg."—*Archivio p. l. Scienze Mediche*, Vol. IX., p. 407, 1886.

It is to be regretted that this special name should have been given when the substance is not a carbohydrate but a nitrogenous body, having no affinities to the sugars proper save in the peculiar quality of sweetness, and when again the term saccharin has already been employed by Peligot[2] to designate a dextrogyrous sugar obtained by the prolonged heating of a solution of glucose with lime. The saccharin prepared by Fahlberg of New York is made from toluene, a derivative of coal tar, and has the formula $C_6H_4 \begin{matrix} CO \\ SO_2 \end{matrix} NH$ being anhydro-ortho-sulphamin-benzoic acid, or benzoyl-sulphonic-imide. It is a white crystalline substance, difficultly soluble in cold water, more easily in hot, crystallizing out on cooling in short, thick prisms, apparently monoclinic. According to Aducco and Mosso, the aqueous solution is strongly acid. Saccharin melts at 200°C., partially decomposing and giving off the smell of bitter almonds.

Even when the amount present is so small as one part in 70,000 of water, the neutralized solution has a distinct sweet taste—as sweet, that is, as that of one part of cane or beetroot sugar in 250 parts of water; so, therefore, saccharin would seem to possess 280 times the sweetness of ordinary sugar. Alcohol, ether, and glucose are good solvents, and it is precipitated out of the neutralized solution by hydrochloric acid. Its salts also possess a strongly saccharine taste.

Aducco and Mosso, studying the physiological action of this body, found that frogs could be kept for days, and with impunity, in a neutralized watery solution. Dogs also exhibited no ill effects when saccharin was given in increasingly large quantities up to 5 grams daily for several days. The body-weight continued unaltered. The saccharin was discovered unchanged in the urine; it seems to undergo no change in the body. It does not influence the quantity or specific gravity of the urine, nor does it cause any change in the urea and sulphuric acid excreted; the chlorides are slightly increased. The presence of saccharin in the urine delays decomposition.

Stutzer, as well as Aducco and Mosso, obtained similar results in the human subject, 5 grm. daily having no ill effect, passing away by the kidneys and appearing neither in the saliva, nor in the milk, nor in the fæces; the appetite remained unaffected. Now 5 grm. of saccharin, it must be noted, are equal in sweetening power to more than two and half pounds of sugar.

[2] Peligot, *Comptes Rendus*, T. 89, p. 918; T. 90. p. 1141, 1879.

From this it will be seen that Fahlberg's saccharin may become, in certain cases, a useful substitute for sugar. In diabetes, Dreschfeld[3] has determined no alteration either in the quantity of urine or in the amount of sugar passed. According to Levinstein,[4] diabetic patients in Berlin have been treated with it for several months, without experiencing any ill effects. Its use is further indicated in obesity. Saccharin has scarcely any retarding effect on the digestion of either proteids or hydrocarbons, and in two cases of acid dyspepsia Dreschfeld found that it relieved some of the troublesome symptoms. Stutzer has noticed that when added in small quantities it increases the diastatic action of malt in presence of sugar.

As an indication of other possible uses it may be remarked that Levinstein,[4] at a meeting of the Society of Chemical Industry, in Manchester, exhibited a specimen of quinine, in which the bitter taste had been masked by the addition of a small quantity of saccharin.

J. G. Adami.

—*Med. Chronicle*, April, 1886.

MINUTES OF THE PHARMACEUTICAL MEETING.

Philadelphia, May 18, 1886.

The last of the present series of Pharmaceutical meetings was held this afternoon; Mr. Wm. B. Webb in the chair.

Mr. Bowen, of Melbourne, President of the Australasian Pharmaceutical Association, being present, was introduced to the meeting and expressed his pleasure at seeing the facilities which the college had provided for the education of students of pharmacy, and thought the influence of the pharmaceutical meetings must be productive of good to the members of the profession.

Donations to the library were made as follows: Jahresbericht für Agricultur-Chemie; Proceedings of the American Pharmaceutical Association for 1885, and Report of the Smithsonian Institution.

The prescription, which was submitted at the last meeting, was the first subject for discussion, and, as agreed upon, Mr. Procter instituted experiments upon the subject just after the last meeting, using the proportion of 5 grains of potassium carbonate to ℥ss of fluid extract of buchu, made strictly according to the formula of the United States Pharmacopœia. This preparation showed no signs of decomposition or of any of the gummy or soapy deposit which took place in that which had been exhibited at the last meeting. The sample was kept in

[3] Dreschfeld, *British Medical Journal*, 1886, p. 409.

[4] Levinstein, *Journal of the Society of Chemical Industry*, Feb. 27th 1876, p. 75.

the store about three weeks, and another sample, made but a short time since, was of the same appearance as that which had been made for some time; this, it was thought, proved that the reaction, described at the last meeting, was caused by the fluid extract employed being made in a different manner from that directed by our pharmacopœia.

A note on *fluid extract of corn silk*, the stigmata of Zea Mays, written by Spencer Phillips, of Topeka, Kansas, was read, and the sample of the fluid extract submitted with it, had an odor very like either that of ergot or colchicum. The formula is as follows:

Dried Corn Silk	16 oz.
Diluted Alcohol	q. s.
Diluted Hydrochloric Acid	$f\bar{3}$j.
Glycerin	q. s.

Grind the corn silk in a mill as fine as possible. Having moistened the ground drug sufficiently, pack firmly in a glass percolator, then add enough menstruum to saturate and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having covered the percolator, let it macerate *four days*. Then allow the percolation to proceed until the drug is exhausted. Having reserved the first thirteen fluid ounces, evaporate the remainder, having first added the diluted hydrochloric acid to this portion, by aid of a water bath, to the consistence of a soft extract. Dissolve this soft extract in glycerin and add sufficient glycerin to make the measure of one pint when added to the reserved liquid. By using a still, the cost of the fluid extract is reduced to less price than it can be obtained by purchase.

The reading of this note elicited a conversation upon the value of corn silk as a therapeutic remedy; some of those present doubted whether it had any value at all, while another member stated that a medical friend found it valuable as a remedy in diseases of the kidneys; and there is good authority for believing it to be active as a diuretic. A difference in the color of the sample exhibited, and that of other makers which was upon the market, was explained by the statement that some was made from the fresh pale green corn silk, and that others were prepared from the dried drug, like the sample shown.

A member asked what was the usual practice in reference to *lard* for pharmaceutical uses, and what was found best in practice. One of those present stated that he had lard made in the country specially for him and found it entirely satisfactory. The inquiry was made whether the refined lard of commerce was pure enough for medicinal purposes; this was answered that one of the houses who refined very large quantities of lard stated that they made none at all, but merely refined it. It was queried, What percentage of water was present in commercial lard? but no one present stated that they knew what amount of water it did contain. The preservation of lard by means of benzoin and poplar buds was also discussed, and some thought that benzoic acid would answer as well as benzoin, while another present expressed the opinion that the resinous matter of the gum benzoin was the efficient agent.

The subject of *concentrated nitrous ether* being used to add to alcohol in proportions alleged to make sweet spirit of nitre, was brought up for discussion,

and the opinion was expressed that it would allow of too great variation in the preparation. As the true ether boils at a temperature of 64·4, it is clear that any solution of it that can be transported in ordinary commercial transactions, when added to nineteen parts of alcohol, cannot result in a 5 per cent. solution of the true ethyl nitrite.

A member asked which was the proper way to dispense *oily* or *oleoresinous liquids*, when prescribed with aqueous menstrua? whether they should be emulsionized with some substance that would render the mixture homogeneous? This process was thought to be the best course.

The following prescription was read: acid. benzoic., ʒij; liq. ammonii acetatis, ℥iij; elix. simp., ℥j. Thus written the formula cannot be dispensed, if the exact letter of the prescription is followed. By the addition of a small amount of liq. ammoniæ the trouble ceases.

A *poison guard* was described by the actuary; it is the invention of Mr. R. C. Hartranft, of this city, for which a caveat has been filed. The cork has a disk of tin with a serrated edge cemented to it, and it is claimed that any one, on attempting to open a bottle with this device attached to it, will be certain to notice the fact. This, and every other mechanical contrivance, has this disadvantage, that those who expect poisons to be thus guarded, will think that those vials not so guarded may be used without danger.

There being no other business, on motion the meeting adjourned.

Thos. S. Wiegand, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Chicago College of Pharmacy.—The chair of pharmacy, made vacant by the resignation of Prof. Oldberg, will, during the coming session, be occupied by Prof. N. Gray Bartlett, who was formerly connected with the same college as a teacher, and brings to his new position his long experience as a lecturer and as a pharmacist.

Illinois College of Pharmacy.—The lecture room and the laboratories will be located at the corner of Lake and Dearborn streets, in Chicago. The faculty consists of Oscar Oldberg, Phar.D., Professor of Pharmacy and Director of the Pharmaceutical Laboratory; John H. Long, Sc.D., Professor of Chemistry and Director of the Chemical Laboratory; W. Kerr Higley, Ph.G., Professor of Materia Medica and Director of the Microscopical Laboratory; and John Conrad, Ph.G., Assistant to the Chair of Pharmacy and Director of the Dispensing Department.

Alumni Association, Louisville College of Pharmacy.—At the annual meeting, held April 7th, O. A. Beckman was elected President; B. Buckle and P. Heuser, Vice-Presidents; P. Fisher, Treasurer; O. C. Dilly, Recording Secretary; and O. Hausgen, Corresponding Secretary. In addition to the officers the Executive Board consists of O. E. Muller, A. Schackner, E. Goebel, W. Tafel, and A. Schoettlin. Various committees were appointed, and the usual routine business was transacted.

Alumni Association, St. Louis College of Pharmacy.—The eleventh annual

meeting was held February 16th, when the following officers were elected for the ensuing year: President, W. C. Bolm; Vice-Presidents, Chas. Ludeking, and R. H. Smiley; Recording Secretary, H. M. Whelpley; Corresponding Secretary, F. F. Witting; Treasurer, Chas. Gietner; Registrar, Dr. O. E. Treutler; and O. F. Heitmeyer and Louis Schurck, members of the Executive Board. A proposition, made by the president. that a course of lectures be given during the winter months, under the auspices of the Association, was referred to a committee for further consideration.

Arkansas Pharmaceutical Association.—The third annual meeting convened in Little Rock, April 29th. The president, John B. Bond, in the chair. The treasurer reported a balance on hand amounting to $151.20. The New York and Brooklyn formulary for unofficinal preparations was adopted; the draft of a pharmacy law was discussed and adopted; one or two papers were read, and the following officers were elected: President, Dr. J. B. Bond, Little Rock; Vice-President, Dr. J. R. McDaniel, Clark County; Secretary, Dr. J. R. Colburn, Little Rock; Treasurer, E. P. Schaer, Little Rock. The annual meetings of this Association are held simultaneous with those of the State Medical Society.

California Pharmaceutical Society.—At the meeting, held in San Francisco, February 11th, Prof. Behr read a paper, giving his observations on insectivorous plants; a process for making mercurial ointment was shown by Mr. Sommer; papers on ginger ale and on syrup of ferrous iodide were read by Val. Schmidt; on the analysis of an antiferment by S. A. McDonnell; on California liquorice root by F. C. Keil; on cantharidal collodion by F. A. Grazer; and on pharmacy laws by C. Troppmann.

The Connecticut Pharmaceutical Association held its tenth annual meeting in New Haven, February 2d and 3d, the president, J. K. Williams, in the chair. The treasurer, G. P. Chandler, reported a cash balance on hand amounting to $1,123.74. The reports of the various standing and special committees were read; also, a report of the Commissioners of Pharmacy, who, during the preceding year, had issued 470 renewals and 46 new licenses, among the latter, three to graduates in pharmacy. The president's address discussed the pharmacy act, the labor performed by the different committees and officers, various trade interests, the sixth pharmaceutical congress, the metric system, and other topics. After the reading of several papers, the following officers were elected: President, F. M. Wilson, Williamantic; Vice-Presidents, C. E. Bristol, Ansonia and E. A. Tomlinson, Plainville; Secretary, F. Wilcox, Waterbury; Treasurer, G. P. Chandler, Hartford. A number of committees were appointed, and various subjects of general and local interest discussed. The next meeting will be held at Meriden. J. H. Parker, Local Secretary.

The Georgia Pharmaceutical Association convened at its eleventh annual meeting in Savannah, April 13th and 14th. Reports were received from the officers and committees. Several papers were read and discussed; the legislation requiring scarlet colored labels for morphine was considered, and a number of prizes were awarded for various pharmaceutical preparations and chemicals, made by the members. The officers for the ensuing year are: President, J. W. Stanford, Cuthbert; Vice-Presidents, P. C. Magnus, Atlanta, F. J. Moses, Augusta, and L. C. Strong, Savannah; Treasurer, T. L. Massenberg; Secretary, H. R. Slack, Jr., La Grange. Cumberland Island was selected as the

place for holding the next annual meeting, on the second Tuesday (12th) of April. C. L. Boyd, of Brunswick, is the local secretary.

Iowa State Pharmaceutical Association.—The seventh annual meeting took place at Des Moines, February 10th and 11th, the president, C. R. Wallace in the chair. The reading of the president's address and of the reports of the officers and a number of committees, occupied the attention of the meeting, the members present participating freely in the discussions. The draft of a bill amending the pharmacy act was fully considered; one of the amendments proposed to abolish the registration of graduates in pharmacy without examination, but the Association recommended that such graduates coming from colleges of pharmacy, requiring attendance upon two full courses of lectures and a practical business experience of at least four years, may be registered without examination, at the discretion of the Commissioners of Pharmacy. The general assembly was also requested to appropriate $3,000 to the State University, for the proper equipment of the laboratory of its Department of Pharmacy, and a standing committee was created to consult with this department. A number of papers, mostly referring to subjects connected with the trade, were read. The election of officers resulted as follows: President, A. H. Miles, Des Moines; Vice-Presidents, E. L. Boerner, Iowa City, J. P. Van Cise, Mount Pleasant, and S. G. Winchester, Eldora; Secretary, Mrs. Dr. Rosa Upson, Marshalltown; Treasurer, C. H. Ward, Des Moines. An adjournment was finally had to meet again at Waterloo, on the second Wednesday (11th) of May, 1887. C. D. Wangler was elected local secretary.

Kentucky Pharmaceutical Association.—The ninth annual meeting, held at Bowling Green, May 5th and 6th, was called to order by the chairman of the executive committee, J. W. Fowler, and organized by the election of J. W. Fowler as temporary chairman, and C. S. Porter as temporary secretary. Reports of officers and committees and a number of papers were read and discussed, and the following officers were elected: President, J. W. Fowler, Louisville; Vice-Presidents, Wm. Turner, Bowling Green, A. Peter, Louisville; and J. H. Lyne, Henderson; Recording Secretary, Wm. B. McRoberts, Stanford; Corresponding Secretary, Edward Goebel, Louisville; Treasurer, J. J. Brooks, Richmond. The next meeting will be held in the city of Louisville.

Louisiana State Pharmaceutical Association.—At the fourth annual meeting, held in New Orleans, April 21st and 22d, the usual reports of committees and officers were read, that of Treasurer Lavigne showing a cash balance of $555.75 on hand. The annual address of President A. K. Finlay treated of educational, legislative, and mercantile questions applying to pharmacy. Papers were read by F. Lascar, on "Disguising the Taste of Quinine;" by the same, and by R. N. Girling, on "The Prescribing by Physicians of Copyrighted Nostrums;" and by Hiland Flowers, on "The Prescribing by Physicians of Medicines Made According to Known Standard Formulas." The discussions on these and other subjects were of considerable interest. The officers elected for the ensuing year are: President, Oscar Robin; Vice-Presidents, C. L. Keppler and F. T. Roger; Recording Secretary, L. F. Chalin; Corresponding Secretary, Mrs. E. Rudolf; Treasurer, J. B. Lavigne. The next meeting will again convene in the city of New Orleans on the second Wednesday (13th) of April, 1887.

Virginia State Pharmaceutical Association.—The fifth annual meeting opened with a public reception at the Opera House in Alexandria, on the evening of May 11th, the business meetings being held on the two days following. The annual address of the President, J. W. Thomas, Jr., discussed the recently-passed pharmacy law and other matters of interest to the pharmacists of the State and the members of the Association. Committees and officers reported as usual. Among the papers read and discussed were the following: On "Syrup of Wild Cherry," by T. Roberts Baker; on "The Metric System," by Hugh Blair; and on "The Relation between the Specific Gravity, Specific Heat and Combining Weight of the Chemical Elements," by J. L. Kellar. The following officers were elected for the ensuing year: President, Hugh Blair, Richmond; Vice-Presidents, E. A. Craighill, Lynchburg; Edgar Warfield, Alexandria; J. A. Jeffries, Warrenton; and F. M. Wills, Charlottesville; Recording Secretary, E. R. Beckwith, Petersburg; Treasurer, F. H. Masi, Norfolk; Corresponding Secretary, T. Roberts Baker, Richmond. The next meeting will be held at Richmond, on the second Tuesday (10th) of May, 1887, with Polk Miller, Local Secretary.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Dr. F. Beilstein's Lessons in Qualitative Chemical Analysis; with copious additions, including chapters on chemical manipulations, analysis of organic substances and lessons in volumetric analysis. By Charles O. Curtman, M.D., Professor of Chemistry in the Missouri Medical College and in the St. Louis College of Pharmacy. Second edition, revised and greatly enlarged, with additional chapters on analysis of drinking water and of urine. St. Louis: Druggist Publishing Co., 1886. 12mo, pp. 200. Price $1.50.

On the appearance of the first edition of Prof. Curtman's work, we have noticed it at length and commended it favorably in the JOURNAL for 1863, page 479. The present edition differs but little from the former, so far as Beilstein's lessons are concerned; but the remaining half of the book has been considerably augmented by the addition of organic acids and alkaloids not previously considered; of new chapters on volumetric analysis, and of the analytical methods for the examination of drinking water, urine and urinary sediments and calculi. Reliable in its statements, and methodical in the arrangement of the material, this enlarged work will doubtless prove as valuable and useful, or even more so, than the first edition. As a commendable feature, should be mentioned the judicious selection of many new illustrations. On page 114 we notice a statement, from which it might be inferred that the use of amylic alcohol for the separation of alkaloids had been introduced by Otto, whereas, it was first proposed in 1861, by Erdmann and Uslar, the process being modified in the following year by R. Palm, by treating the liquid rendered alkaline, and supposed to contain alkaloids, with amylic alcohol, instead of evaporating the alkaline liquid previously to dryness.

A Compend of Pharmacy. By F. E. Stewart, M.D., Ph.G., &c. Philadelphia: P. Blakiston, Son & Co., 1886. 12 mo, pp. 196. Price $1.00.

This work, being based upon Prof. Remington's valuable Text Book of

Pharmacy, it does not seem necessary to speak of its scope, arrangement and general correctness. The facts are well presented and concisely stated, and the book is well adapted for a student's note-book, to be used for the thorough study of the subject.

The Modern Crematist. Edited and published by M. L. Davis, M.D., and W. U. Hensel, Lancaster, Pa. Price, $1.00 per year.

This, we believe is the first journal published in the United States which is devoted to the subject of cremation. It is neatly printed and contains many well written articles. We may be permitted to quote the result of an analysis made by Prof. T. R. Baker, of the gases from the chimney of the Lancaster Crematorium, both before and during a cremation; the figures given are fractions of a cubic inch to the gallon, the gases having been passed through U tubes and through distilled water:

	H_2O.	CO_2.	Illuminating gas.	O.	CO.	N.
Before	·0011	·00980	. .	·0080	. .	·016
During	·0044	·00091	·012	·0065	·0017	·015

Department of Agriculture, Division of Chemistry. Bulletin No. 9. Third report on the chemical composition and physical properties of American cereals: wheat, oats, barley and rye. By Clifford Richardson. Washington: Government Printing Office, 1886. 8vo, pp. 82.

Third Annual Report of the Board of Control of the State Agricultural Experiment Station at Amherst, Mass. (1885). Boston. 8vo. pp. 141.

Massachusetts State Agricultural Experiment Station. Bulletin No. 19. April, 1886. pp. 12.

These three pamphlets contain numerous analyses of agricultural products; also of fertilizers, etc.

On the Limitation of the Contagious Stage of Syphilis, especially in its Relations to Marriage. By Prof. F. N. Otis, M.D. New York: Wm. Wood & Co., 1886. 8vo, pp. 16.

Reprint from the *Journal of Cutaneous and Venereal Diseases*, Vol. IV.

The following reports have been received:

Of the Council of the Pharmaceutical Society of Australasia, for 1886.

Of the Illinois State Board of Pharmacy.

Of the North Carolina Board of Health. No. 1. (Published monthly).

Of the German Hospital of the City of Philadelphia, for 1885.

Of the Observatory in Yale College, for 1884-5.

Of the Civil Service Reform Association. (Fifth annual).

Thebaine Hydrochlorate, according to Dr. Bono, is an excellent myotic, similar to eserine, but producing less spasm and myosis. One drop of a 1:40 solution produces its effect in half an hour, the effect passing off in four or five hours.—*Les. Nouv. Remèdes*, March 1, 1886.

THE AMERICAN

JOURNAL OF PHARMACY.

JULY, 1886.

ON THE BITTER PRINCIPLE OF THE AMERICAN CRANBERRY (VACCINIUM MACROCARPON, *LIN.*)

By Edo Claassen.

The existence of arbutin in the cowberry (*Vaccinium Vitis Idœa, Lin.*) was announced by me in No. 7, vol. 57, of this Journal. On account of this fact it was thought to be not only possible but probable, that the same principle would also exist in the American cranberry, a plant in botanical respect similar to the first-named (although not belonging to the same sub-genus, to *Vitis Idœa, Tourn.*, but to the subgenus *Oxycoccos, Tourn.*). This supposition seemed to be corroborated by the bitter taste of the fruit and by the blue colored liquid, which an extract of it gave with phosphomolybdic acid and ammonia (a reaction, said in No. 5, vol. 43, of this Journal, to be peculiar to and indicating the presence of arbutin). Although I had failed already once (see No. 7, vol. 57, of this Journal) to find arbutin in the berries, I undertook again the work and the trial, to separate arbutin from the branches and leaves of this shrub as well as also from the berries, in order to get at least, if no arbutin should be found, a clear idea and an exact knowledge of the nature of the bitter principle in it.

As the cranberry does not grow in this vicinity, Professor John M. Maisch was kind enough to furnish me about 8 pounds of the dry shrub, a quantity more than sufficient to make the necessary investigation. With the intention to also ascertain at the same time the presence in it of kinic acid, I divided the whole quantity received into two parts and subjected them to the following experiments:

Experiment 1.—One portion of the branches and leaves was boiled with water for half an hour; the liquid was separated by straining through a cloth, then somewhat concentrated by evaporation, acidulated with acetic acid, precipitated with neutral lead acetate, the liquid

separated by means of a filter and then mixed with lead subacetate, carefully avoiding an excess of it. The precipitate was collected on a filter, washed several times with cold water and *preserved for further examination in regard to the presence in it of kinic acid;* but the filtrate was saturated with sulphuretted hydrogen gas for the purpose of removing from it all the lead. After having separated the precipitate formed by a filter, the clear bitter liquid was evaporated to a thin syrup and set aside in a cool place for crystallization. The result will be found below.

Experiment 2.—The other portion was boiled for half an hour with water under addition of a sufficient quantity of quicklime, enough to give the liquid a strongly alkaline reaction; it was then strained, acidulated with acetic acid and precipitated with neutral lead acetate. After having removed the lead precipitate, the liquid was treated with sulphuretted hydrogen gas and after filtration evaporated to a syrup. The syrup was by and by mixed under almost continuous shaking with alcohol of 0·820 spec. grav., enough to remove from the liquid all the parts insoluble in the same. *This precipitate containing all the kinic acid, if present, in form of calcium kinate, was preserved for further trials;* but the liquid was subjected to distillation to recover the alcohol, the residue evaporated to a thin syrup, and put aside in a cool place for several weeks, so that crystals might make their appearance. As, however, no crystals were found at the end of that time in the syrup, it was diluted with water, precipitated with lead subacetate, filtered, the filtrate treated with sulphuretted hydrogen gas, the liquid obtained after filtration evaporated to a thin syrup and again set aside in a cool place for several weeks. But, like before, no crystals were formed. The same was the case with the syrup-like liquid in experiment 1. Both were, therefore, poured into one bottle and for further purification repeatedly treated with a mixture of 1 part of alcohol of 0·820 spec. grav. and of 3 parts of officinal ether of 0·750 spec. grav. The solution obtained was subjected to distillation and the syrup-like residue again put down for crystallization; even after the lapse of several weeks also this liquid did not show any tendency to crystallize, as did not too the bitter liquid left in the bottle after the treatment with the above solvents, which, as may be mentioned, seemed to be impurer than the dissolved portion.

The bitter principle thus obtained cannot evidently be regarded, although considerable care was taken in preparing it, as the principle in

its purest state. The result of testing it and its solution with reagents was the following :

1. Chlorhydric acid dissolved the same without change of color; but soon the liquid turned somewhat darker and got turbid under evolution of a strong peculiar smell.

2. Nitric acid dissolved it with light orange color.

3. Sulphuric acid dissolved it with brown color, which turned soon darker and got nearly black under separation of coal.

4. Boiled with very dilute sulphuric acid, the liquid showed very soon a turbid appearance, evolving at the same time a strong, peculiar smell; a resin-like mass was seen suspended in the now clear liquid after a continuation of the boiling for several minutes.

5 An alkaline copper solution, heated with the solution to the boiling point, showed hardly any change of color and *not the smallest trace* of a deposit of copper protoxide.

6. The liquid obtained under 4 after the treatment with dilute sulphuric acid, furnished, when heated with an alkaline copper solution, a copious precipitate of copper protoxide.

7. A very dilute iron sesquichloride-solution did not produce any perceptible change of color.

8. Ammonia and phosphomolybdic acid-solution turned the solution of the bitter principle blue like that of arbutin; the blue color disappeared also by and by.

9. Neutral lead acetate, lead subacetate, lead subacetate and alcohol (which precipitate ericolin), platinum chloride, potassium iodide, iodine and potassium iodide, gallic and tannic acids did not give any precipitates. Mercury bichloride caused a little turbidity, which by heating the liquid increased somewhat and settled down in yellowish brown flocks. Silver nitrate effected also a hardly visible turbidity, which remained the same when the liquid was heated to the boiling point; but by continued boiling the liquid soon turned brown, growing by and by darker, and then gave a copious brownish black deposit of silver.

Having failed thus far, to find a crystallizable principle in the leaves etc., two more experiments were made with the berries:

Experiment 3.—Several pounds of the nearly ripe berries (these having decidedly a more bitter taste than the ripe ones) were crushed, mixed with water and hydrated lead oxide enough to remove the acid taste, then pressed, the liquid filtered, saturated with sulphuretted hy-

drogen gas and after filtration evaporated to the consistency of a thin syrup, in which, however, no crystals were formed even after two weeks' standing.

Experiment 4.—Several pounds of the not quite ripe berries were crushed and macerated with water until the whole presented itself as a reddish mass; it was then pressed, the liquid precipitated with lead subacetate and this mixture evaporated on the water bath to the consistency of a thin extract, which was repeatedly treated with hot alcohol. The alcoholic liquid was distilled and the residue left in the flask, as it gave yet a precipitate with lead subacetate, was treated with this reagent. After having removed the lead from the filtrate, the latter was evaporated to a thin syrup, which, however, did not furnish any crystals. The syrup-like liquids, obtained in 3 and 4, were then for further purification mixed, repeatedly extracted with a mixture of 1 part of alcohol of 0·820 spec. gravity and of 3 parts of officinal chloroform, the solution subjected to distillation and the residue dissolved in water. This solution possessed a sweetish bitter taste and reduced an alkaline copper solution, evidently proving that some of the glucose, contained in the berries, had entered the same; for further purification it was now treated with a mixture of 1 part of alcohol of 0·820 spec. grav. and of 3 parts of ether of 0·735 spec. grav.; but without the desired result, as the liquid remaining after the separation of the alcohol and ether did yet reduce an alkaline copper solution. As always before *no* crystallization took place in the properly condensed liquid. The bitter principle thus obtained from the berries, conducted itself equal to that prepared from the leaves *with the exception*, that it, as stated, reduced an alkaline copper solution, as also a silver nitrate solution, which latter too was due to the presence in it of glucose; the reduction of the copper solution was effected long before the boiling point was reached; the silver solution also was easily reduced as soon as the liquid began to boil, in which last case a slight mirror of silver was deposited on the glass, while a brownish black powder was suspended in the liquid. According to the above, the bitter principle of the cranberry can be prepared and obtained in a purer state more easily from the leaves etc., than from the berries.

The result of the above experiments and of a few other trials is, as may be said here in a few words, the following:

The American cranberry (*Vaccinium macrocarpon, Lin.*) contains in all parts a very bitter uncrystallizable principle, for which I would

propose the name *oxycoccin*. It represents a yellowish brown extract-like mass, which gives, when dried, a very hygroscopic powder of lighter brown color.

It dissolves easily in water and alcohol, very sparingly in ether and chloroform. When heated on platinum foil, it at first swells up considerably, evolving a strong, peculiar smell, then ignites with flame and is almost entirely consumed, leaving but little ashes (of an alkaline reaction), containing sodium and some potassium. Heated in a glass tube it is easily reduced to coal under evolution of a penetrating smell somewhat resembling that of tobacco juice. In its conduct towards reagents it resembles somewhat arbutin; like this substance, which, however, forms long needle-shaped crystals, it reduces, when heated for a short time with very diluted sulphuric acid, an alkaline copper solution; besides that it is giving a blue color with phosphomolybdic acid and ammonia, a reaction, which from now *cannot be used any more* for the detection of arbutin in a liquid, and the only value of which is consequently, that *by means of the same the absence*, but not the presence, of arbutin can be ascertained.

Of the above reactions the most interesting is that one, which shows that the bitter principle of the cranberry is converted by boiling with dilute acids into glucose and another perhaps yet unknown substance, and that, in consequence of this fact, it belongs to the glucosides.

Finally I may be allowed to mention in regard to the above obtained lead and calcium precipitates, that their examination was already commenced some time ago and that from them a calcium salt was obtained, forming beautiful four—or mostly six—sided plates, on the identity of which with calcium kinate the necessary tests will be made soon.

CLEVELAND, MAY, 1886.

Kava as a Local Anæsthetic.—Lewin (*Deutsche Medicinal-Zeitung*, Feb. 1, 1886) reports the results of additional personal experiments with this new narcotic, the anæsthetic properties of which are singularly like those of cocaine (see this JOURNAL, p. 138). He found that six or seven minims of a solution of kava, injected beneath the skin, produced complete loss of sensibility in the surrounding area, which did not pass off for five days. The anæsthesia was so extreme that even strong induced currents failed to produce more than a slight prickling sensation. When a small quantity of the resin was placed on the tip of the tongue the bitterest drug could not be tasted.—*N. Y. Med. Jour.*, May 8, 1886.

OFFICIAL PHARMACY.

By R. Rother.

When individual experiences find agreement at large the correspondent beliefs arising from this consensus of practice finally assume an authoritative form. Whilst, in the beginning, dissent, if merely passive is at least respected, the rule of custom at last generates a public opinion whose stringency exacts a rigid conformity. If, however, these demands eventually prove onerous under new conditions, or, if their fallacy becomes pronounced, a decided and powerful reaction does not fail to modify, if not wholly disregard, them. In aggregates not altogether despotically regulated, a unanimity of public assent is essential to coercion, as without its sanction legislative enactments can attain no permanent force. The unwritten law is, in the last resort, the one source from which all others emanate. Ignoring the voluminous and questionable body of laws having their origin in a sophistical legal system, there is yet remaining a sound codified legal nucleus at the base of social activity. Upon this fundament rest the various semi-legal codified authorities, designed to regulate the diverse ramifications of the industrial system of society.

After undergoing a variety of transformations, conventional methods finally attain the attributes of custom, if not the more definite authority of technical law. This would indicate that the practice of appropriate action in becoming organized and organic, persists independent of extraneous reinforcement, and thus precludes the supervision of authority. This would be true in a perfectly homogeneous system, but not in systems having components of all orders and degrees of correspondence. Furthermore, the most accomplished individuals are in no less need of an exemplary guide than the least accordant are of a coercive regimen. Thus, whilst the better adapted have a thorough comprehension of the exigencies at large and their own concordance with them, the general intricacy of the interactions renders an authorized guide most serviceable, even to them. Then, as regards the greater portion who are more or less deficient in these respects, the intervention of a technical authority becomes indispensable.

The Pharmacopœia is a semi-legal code whose authority is, however, at present chiefly based upon a generalized conventionality, rather than upon a prevalent custom, public opinion, or legal form. It thus shows itself to be in the incipient stage of progress. Under such

circumstances, its acceptability mainly rests on the intrinsic merits of its character. If it is clear, concise, practical and withall scientific—its field of usefulness and consequent authority will correspondingly expand and prevail. If it is hampered by uncongenial methods, forms and superfluities—its general recognition will suffer a commensurate retardation.

Much can be said in favor of the new Pharmacopœia. Its general arrangement is simply admirable. The introduction of chemical symbols is equally commendable. The retention of the old notation along-side the new is a feature whose force, however, is not apparent. Had this place been filled by the so-called constitutional expressions of the previously given empirical formulæ, the scientific and practical character of the work would not have suffered thereby in the least. The descriptive parts are not new, however, and, although bettered, still admit of great improvement. A new feature of a rather questionable nature has been introduced. This is, namely, an extension of the systematic part relative to biological Materia Medica. Heretofore, it was deemed all sufficient for the Pharmacopœia to indicate the necessary relationships of biological products, by simply referring them to species and genus. This now appears to be insufficient, and hence, also, order and class is given. If such exact discrimination is essential, it would appear that strict scientific accuracy demands a more particular proceeding than the one officially adopted. A description of this kind, in order to be of any value, requires the tracing of an unbroken line of the relations. A proper systematic arrangement must include, in regular gradation, not only the specifical and generical reference, but also the tribal, ordinal, cohortal, classal, etc. Also, in order to maintain its authority unchallenged the Pharmacopœia should forego acknowledged antiquated forms by promptly assenting to standard classification.

The Pharmacopœia contains nearly 250 separate items of systematic references. The class *Insecta* is composed of four very characteristic and distinct sub-classes. Three orders of Insects are officially cited, but the fact was omitted that they belong to the sub-class *Hexapoda.*

According to standard classification, there is no order Sturiones. The *Acipenseridæ,* or Sturgeons, constitute only a group or family of the order *Chondroganoidei,* sub-class *Ganoidei,* class *Pisces.*

There is no order Teleostia, as officially given under Oleum Mor-

rhuæ. The family *Gadidæ* are part of the order *Teleocephali*, sub-class *Teleostei*, class *Pisces*.

The *Gallinæ* are no order. Like the *Cracidæ* and *Columbæ*, they are merely one of the numerous groups of one of Huxley's four principal divisions of the order *Carinatæ*, class *Aves*.

The term Pachydermata is so antiquated and obsolete that it would be difficult to find, even in a public school text-book. In the Pachydermata, the *Proboscidea* were mixed up with artio and perissodactyl ungulates. The *Suidæ* are a family group of the Non-Ruminants of the sub-order *Artiodactyla*, order *Ungulata*, sub-class *Monodelphia*, class *Mammalia*.

The *Bovidæ* belong to the Ruminantia of the sub-order *Artiodactyla*, order *Ungulata*, sub-class *Monodelphia*, class *Mammalia*.

It appears like a somewhat remarkable distinction that in its references to the Animal Realm, the Pharmacopœia should use only the term order, whereas in connection with the Realm of Plants the designation Natural Order only occurs. The qualifying addition "Natural" is here wholly superfluous, since the distinctions are all manifestly based upon natural characters.

There is no order of Algæ, as the Pharmacopœia has it. The term Alga is not systematic. It is merely general, signifying an aquatic chlorophyllic thallophyte. Thallophyte is also but a conventional term having no systematic significance. It embraces plants contained within the first four Primary Divisions of the Vegetable Realm, namely, the *Protophyta*, *Zygosporeæ*, *Oosporeæ* and *Carposporeæ*. Thus, for instance, the greater part of the green algæ of ponds and streams belong to the primary division *Zygosporeæ*.

There is also no order of Fungi, as is officially given. The term Fungus is merely of general import, meaning a terrestrial chlorophylless thallophyte.

As may be readily inferred from what was previously said, thallophytes are not all thallus plants. Although the distinction between algæ and fungi is but a physiological one, depending upon the presence or absence of chlorophyll, no more are all chlorophylless plants fungi. Thus, for instance, the noted Bacteria are detached or clustered chlorophylless cells belonging to the order *Bacteriaceæ*, class *Schizomycetes*, pr. div. *Protophyta;* whereas, fungi are chiefly the higher grades of Thallophytes.

A somewhat similar but inverse confusion exists in regard to the

term mould. The order *Mucorini*, or Moulds, belongs to the class *Conjugatæ*, of the pr. div. *Zygosporeæ*, and is the only order of this division which contains no chlorophyll, although related by class limits to the unicellular algæ, composing the orders *Desmidiaceæ* and the wonderful *Diatomaceæ*. Now the so-called common blue mould, *Penicillium glaucum*, is not a mould, but a saprophytic fungus of the order *Tuberaceæ*, class *Ascomycetes*, pr. div. *Carposporeæ*. The primitive plants called Slime Moulds are otherwise the class *Myxomycetes*, pr. div. *Protophyta*.

The official species belonging to the genus *Chondrus* are marine algæ of the order *Gigartineæ*, class *Florideæ*, pr. div. *Carposporeæ*.

The fungus of Ergot belongs to the order *Pyrenomycetes*, class *Ascomycetes*, pr. div. *Carposporeæ*.

The fungus *Ustilago Maydis*, or corn smut subsists parasitically in the tissues and chiefly the ovary of *Zea Mais*, and belongs to the order *Ustilagineæ*, class *Ascomycetes*, pr. div. *Carposporeæ*.

The Phanerogamia, or floral plants, compose the two classes of *Gymnospermæ* and *Angiospermæ*. The latter also contains two subclasses, the *Monocotyledones* and the *Dicotyledones*, divided into numerous cohorts.

In the Animal Realm the Pharmacopœia extended its classification as far as classes, but in the Realm of Plants it does not go beyond orders. The force of such discrimination is not apparent.

It appears that the orders Melanthaceæ and Smilaceæ of the Pharmacopœia have no existence, but colchicum, sarsaparilla, cevadilla and veratrum belong to the order *Liliaceæ*.

There is no order Zingiberaceæ, but there is a sub-order *Zingiberæ*, order *Scitamineæ*, cohort *Amomales*.

The chestnut and oak are in the sub-order *Quercineæ*, order *Cupuliferæ*.

The elms belong to the order *Ulmaceæ* of the cohort *Urticales*, and not, as officially stated, to the order *Urticaceæ*. As the latter contains no sub-orders, consequently Ulmeæ has no existence.

For this reason there is, also, no sub-order Cannabineæ; but hemp and hop are of the order *Cannabineæ*, cohort *Urticales*.

For the same reason there is, also, no sub-order Artocarpeæ; but fig belongs to the order *Moraceæ*, cohort *Urticales*.

Storax is of the order *Styracaceæ*, and not of *Hamamelaceæ*, as referred officially.

Uva-ursi and gaultheria are in the sub-order *Ericineæ*, and chimaphila in the sub-order *Pyrolineæ*, both of the order *Ericaceæ*.

Rubiaceæ contains no sub-orders and, consequently, the official Cinchoneæ and Coffeæ do not exist.

There are no sub-orders in *Umbelliferæ*, and therefore, the Orthospermæ, Coelospermæ, and Campylospermæ have no existence.

Pomegranate is in the order *Lythraceæ*, and hence Granataceæ is unknown.

Hamamelaceæ has no sub-orders, and so Balsamifluæ is unreal.

Rosaceæ presents no sub-orders, as indicated in the Pharmacopœia, but it is possessed of ten tribes. Quince belongs to the tribe *Pomeæ*, the roses to *Roseæ*, Rubus to *Rubeæ*, Quillaia to *Quillajeæ*, and the almond, prune and wild cherry to *Pruneæ*.

Officially, the sub-orders of *Leguminosæ* are somewhat confused. The genera *Copaifera* and *Hæmatoxylon* properly belong to the sub-order *Cæsalpinieæ*, and not, as according to the Pharmacopœia, to *Papilionaceæ*.

Rhus and mastic must be referred to the order *Anacardiaceæ*, the official order Terebinthaceæ being unknown.

Guarana is in the sub-order *Sapindeæ*, order *Sapindaceæ*.

There is no order Aquifoliaceæ. Prinos belongs to the order *Ilicineæ*.

Rutaceæ has no sub-orders, but seven tribes. Orange, lemon and bergamot belong to the tribe *Aurantieæ*, prickly ash to *Xanthoxyleæ*, buchu to *Diosmeæ*, and rue to *Ruteæ*. There is no order Aurantiaceæ.

No such order as Erythroxylaceæ seems to exist, but Erythroxylon is found in the order *Linaceæ*.

As there are no sub-orders in *Cruciferæ*, it is evident that the sub-order Siliquosæ is fictitious.

From the practical stand-point of pharmacy, the utility of this extensive classification is not apparent. In illustration of this, a glance at the order *Leguminosæ* will suffice. Furthermore, it can aid very little, but rather confuse, in the identification of biological products listed in Materia Medica. For purposes of identification and guide in reference to quality, the more specific and individual characters require scrutiny, and for such purposes much more ample and effective measures are known.

CAOUTCHOUC IN BENZOIN.

By Charles Schmidt.

Ten ounces Sumatra benzoin were reduced to No. 20 powder and macerated for seven days with an equal weight of alcohol. The resulting tincture was filtered. On examining the dregs on the filter, which seemed to consist chiefly of bark, the writer noticed a whitish substance running through the dregs in fine veins, just below the surface. Upon taking hold of a vein it was found to be elastic. This substance was easily separated from the dregs, and washed with alcohol and water. Slight pressure between the fingers caused it to form into a mass very much resembling caoutchouc. It was forwarded to Prof. Power, of the University of Wisconsin, who kindly examined it and determined it to be really caoutchouc.

The writer procured a second sample of Sumatra benzoin from another lot, but failed to find caoutchouc in it by the above simple process. In this second operation, the dregs remaining in the filter were dried and shaken with carbon disulphide. The clear liquid was poured off and evaporated spontaneously, leaving a light yellow residue. The portion insoluble in carbon disulphide, was shaken with chloroform and the clear solution poured off and evaporated spontaneously, leaving a light brown residue. Both these residues were examined at the John Hopkins' University, through the kindness of Prof. Remsen, but no caoutchouc was discovered in either of them.

This would seem to indicate that the caoutchouc in the first specimen was an accidental impurity and not a natural constituent of benzoin, as was at first supposed by the writer.

Baltimore, June, 1886.

ON SOME PHARMACOPŒIAL SYRUPS.

Abstracts from Theses.

Syrupus Ipecacuanhæ.—On mixing fluid extract of ipecac, prepared strictly in accordance with the present pharmacopœia, with simple syrup, a slight amount of flocculent matter will separate and float in the syrup. Fred. Dunn, Ph.G, observed that the addition of a few drops of ammonia water will prevent the separation; but, it is preferable to mix the fluid extract with water, adding 8 drops of ammonia water for 1 ounce of fluid extract, and percolating this mixture through the requisite quantity of sugar. The resulting

syrup is transparent, of a brown color, and quite efficacious. Some commercial fluid extracts of ipecac required a larger quantity of ammonia to furnish a transparent syrup.

Syrupus Lactucarii.—The present process is complicated and tedious, and requires close attention to the details. Wm. A. McBath, Ph.G., prefers the process recommended by J. L. Lemberger (see Amer. Jour. Phar., 1878, p. 599). Benzin or ether dissolves from coarsely powdered lactucarium a little less than 50 per cent. of inert matter, which is almost tasteless, odorless and colorless, and may be taken in considerable quantity without producing any appreciable effect on the system; but, the two extracts differ somewhat in character. The ether extract is readily broken up in small pieces, and does not stick together unless heated, while the benzin extract is of a soft, waxy consistence, and adheres together in a mass. The lactucarium exhausted by either benzin or ether is treated with diluted alcohol, the tincture evaporated and, with the addition of sugar, converted into syrup.

Syrupus Rhei.—Arthur Berrett, Ph.G., suggests the preparation of this syrup from the fluid extract, and the substitution of oil of Ceylon cinnamon for cinnamon bark; the fluid extract, mixed with the oil, dissolves readily in water containing the potassium carbonate in solution, and, with sugar, is converted into a pleasant and efficient syrup.

Syrupus Rhei aromaticus.—A modification of the pharmacopœial formula is suggested by Edward C. Lafean, Ph.G., whereby the alcohol contained in the syrup is reduced to about one-half the quantity now directed. The modification consists in preparing an alcoholic tincture from the aromatics, and in treating the rhubarb, in powder No. 40, with a mixture of water 2 parts and glycerin 1 part, at a temperature of about 180° F. After straining the infusion and washing the dregs with water, the sugar is dissolved in the liquid, the hot syrup is filtered and, after cooling, thoroughly mixed with the tincture of aromatics. Thus prepared the syrup is transparent, does not precipitate and keeps well.

Syrupus Sarsaparillæ compositus.—With the view of simplifying the pharmacopœial process, and of avoiding evaporation and loss of alcohol, A. Berrett, Ph.G., proposes to use the oils of sassafras, gaultheria and anise in proper quantities in the place of the drugs. The mixed oils are first incorporated with the guaiacum wood, this mix-

ture, with the powdered liquorice root and senna, and, finally, the ground sarsaparilla, is added, followed by the rose petals. For the pharmacopœial quantities, 8 parts of ammonia water are used, of which 6 parts are added to 100 parts of a mixture composed of 1 volume of alcohol and 7 of water. After macerating the mixed powder for one or two days in this menstruum, the whole is transferred to a percolator, and displaced with a mixture of alcohol and water, as before, to the first 200 parts of which 2 parts of ammonia water have been added. The percolation is continued until 400 parts of liquid have been obtained, in which the sugar is dissolved without heat.

Syrupus Tolutanus.—A modification of the pharmacopœial formula is suggested by Silas J. Duffie, Ph.G., who proposes to digest at 80° C. for two hours 4 parts of tolu balsam in 30 parts of water, and to add, after cooling, 4 parts of alcohol; this mixture is strained through a well wetted muslin strainer, and this is washed with water until 35 parts of liquid have been passed, in which 65 parts of sugar are dissolved by percolation. This yields a handsome and permanent syrup, and the presence of the four parts of alcohol is not considered to be objectionable.

TINCTURE OF KINO.

By R. Rother.

The remarkable stability of the homogeneous which is *a priori* inferable is everywhere manifested in experience. Were it otherwise there could be no orderly coherence anywhere. The tendency of like units and groups to segregate is universal. Similar units and aggregates subjected to the same conditions must therefore give the same results, which latter will vary correspondingly as the conditions are changed. Hence a heterogeneous whole will necessarily be transformed into more coherent compacts of interrelated homogeneous groups. Both very simple and complex illustrations of this occur in chemistry. When under certain conditions a chemical reaction results, the product, although evidently more complex, is nevertheless more homogeneous under the new conditions than in the prior sphere. When the new body or bodies thus resulting are again sundered through the influence of light, heat, or other agency, the constituent elements may reappear in their simplest form. Whilst the new con-

ditions supervene the isolated elements following their native affinities are again homogeneously segregated. This shows that the immanent forces determine the states which persist relative to their degree of homogeneity. Hence changeability characterizes those conditions presenting stages tending to more stable adjustments. From this it is evident that the so-called chemical affinities are but secondary qualities, and that the tendency is rather towards a final isolation. The known properties of the chemical elements show them to possess interrelations independent of so-called chemism, indicating that ultimate segregation separates them into more and more related, that is, more and more similar and simpler forms.

The work of the higher agencies, although continually renewed, is ever suffering degradation. This extreme changeability is a characteristic of exceeding heterogeneity, and the conflict results from the selection of the relatively similar into more homogeneous groups. These adaptive actions or adjustments are therefore contingent upon heterogeneity, since the homogeneous presents no differences for selection to assimilate. This makes it manifest that the higher activities can only prevail in the correspondingly heterogeneous, and that an ultimate diversification into the most homogeneous precludes their existence.

Vital redistribution is dependent upon the highest order of unlikeness, and consequently many of its products are comparably intricate. A very active selection is therefore implied, although the groundwork of the various agencies involved is notably similar. It is only in the transitional stages, however, that this unwonted complication of products is found. In the final stages their simplicity and uniformity is equally noteworthy.

The products elaborated by plants, for instance when intercepted during the intermediate phases, constitute not only means of sustentation for other plants and chiefly animals in their normal states, but are importantly energetic in correcting or inducing various abnormal conditions. As segregated in the plant body, many vegetable products are confined to peculiar surroundings, whereby a native supply is maintained. When these substances are naturally merged, or where this occurs artificially, as in case of the galenical products of pharmacy, further reactions occur and ulterior changes take place.

Thus an aqueous or more or less alcoholic extract of an organic drug may at first possess a fastidious transparency. Very soon, how-

ever, in many instances, more or less voluminous precipitates form. These may in some cases be simply due to incapacity of the solvent employed. In others, to reactions among some of the extracted components. In yet others, to effects either of hydration or dehydration resulting from the menstruum. In still others, to changes undergone by the menstruum itself. Further, in others, by septic action, that is, alteration resulting from the original presence of a chemical ferment. Yet, further, in others, as brought about by some extraneous agent of zymotic character, whereby both medium and substance are degenerated. Still, further, in others, where light caused disturbances. And, in others, where atmospheric oxidation produced interferences of a radical nature, which may or may not be aided by light. Whether the carbonic anhydrate of the atmosphere exerts any action in such connection has not yet been ascertained.

The flocculent sediment formed in most fluid extracts and tinctures, although occupying considerable space when in suspension, is yet but trifling in amount and generally inert. It consists, in many instances, of inorganic salts usually tinted by adhering coloring matter. In some cases it is gummy, albuminous or pectinous in nature, and, if of the latter kind, may cause some inconvenience in subsequent filtration.

The deposits resulting from atmospheric oxidation are generally more abundant, and, in some cases, so profuse as to virtually solidify the preparation.

This occurs with tincture of kino as the writer has ascertained (New Remedies, July, 1879). The transformation in this particular instance is not strictly the production of a visible sediment but a gradual thickening of the liquid until wholly firm. Various expedients have been suggested to remedy this difficulty. The present official process employs glycerin, which, however, is as unsatisfactory as all other agents previously tried. The alleged occasional success with sundry corrigents can only be accounted for by the fact that there are numerous varieties of kino, and that one or the other sort may not be susceptible to this change. On the occasion above referred to, the writer advised the exclusion of air as an infallible protection. Results since then obtained have only tended to confirm the efficiency of this method. Some samples of tincture, prepared on the 6th of February, 1880, preserved in filled two-ounce vials, are at present in prime condition. It was previously observed that after some time the corks

become loosened through the contraction induced by the alcohol vapor as well as by changing temperature. In all such bottles the effect of air on the tincture became very manifest. In such that admitted much air gelatinization became complete. If, however, the precaution is taken to look after the corks and keep them fastened no deterioration results. When a vial was partially emptied the remainder invariably jellied in due time. The addition of glycerin before or after gelatinizing had no visible effect, either in preventing the alteration or regenerating the spoiled tincture. As some loss and inconvenience nevertheless results from this treatment, the writer concluded to test catechu in this connection, as tincture of catechu never gelatinizes. An ample proportion of catechu was employed, which, in all probability, is far in excess of actual need. The success of this process is complete, as no change occurs in tincture of kino so prepared, after keeping it for upwards of eight months exposed to the air with impunity. That the catechu is really protective, and not merely so by appearance, for reason of using an unchangeable kino, is shown by the fact that the same kino, used alone, gives an impermanent tincture. Another remarkable circumstance is that a tincture of kino, already quite syrupy from oxidation, when treated with one-third its volume of the catechu-kino tincture, ceases to thicken and remains intact on unlimited exposure thereafter. It is evident that the catechu is not the preserving agent, as a tincture made by using an aqueous extraction of the catechu is equally effective. The writer recommends the following process for preparing a permanent tincture of kino:

Kino.....One and a half troy ounces.
Catechu.....Half a troy ounce.
Alcohol.....Four fluid ounces.
Water sufficient to make one pint.

Powder the kino and catechu, mix them, add ten fluid ounces of water, heat for ten or fifteen minutes with constant stirring, and let the mixture cool. Now add water to the measure of twelve fluid ounces and then add the alcohol. Pour the mixture into a bottle containing sixty grains of filter paper, shake the whole well at intervals and strain the tincture through fabric after twenty-four hours.

PARAFFIN AS AN EXCIPIENT FOR DEOXIDIZABLE SUBSTANCES.

By Geo. Smith, f.c.s.

In a former paper published in this Journal (Am. Jour. Phar., 1884, p. 436), an account was given of some estimation of permanganate of potassium, which had been made into pills containing 2 grains each of the salt with 3 grains of an excipient composed of vaseline 2 parts, paraffin wax 1 part, and kaolin 3 parts. These pills were coated with a solution of sandarac resin in absolute alcohol and had been kept a little over seventeen months before estimation. The results then obtained by treating them and their resinous coating with distilled water till all permanganate was removed, and estimating with a standardized solution of oxalic acid, gave a reduction equal to 70 per cent., but on carefully scraping off the sandarac coating a reduction equal only to about 47 per cent. was observed. The presence of the organic coating alone was thus proved to have exercised a reducing influence equal to 23 per cent. It was, therefore, considered desirable to pursue the investigation further on a pill-mass *per se* made according to the above formula. The best white vaseline and washed kaolin were used in preparing the excipient. The mass was made September 28, 1884, and examined July 6, 1885, consequently it had been kept a little over nine months (two hundred and eighty-one days). The oxalic acid method was again adopted in the estimation of the permanganate, but the solution used differed from the former one in the mode of its titration. This was done by dissolving 6·3 gm. of dry oxalic acid in a litre of distilled water, and ascertaining the exact permanganate value of each c.c. by titration with an aqueous litre solution containing 3·14 gm. of a sample of the salt ($K_2Mn_2O_8$) from which the pills were made. A mean of three carefully conducted estimations made on 10, 20 and 30 c.c., gave an average value of ·00332 gm. $K_2Mn_2O_8$ for each c.c. of oxalic acid solution. The pill-mass used in the estimation weighed 7·74 gm. This, according to the formula, originally contained two-fifths of its weight of potassium permanganate, therefore, the salt theoretically present weighed 3·096 gm. The mass was carefully rubbed down in a clean glass mortar with distilled water at the ordinary laboratory temperature, and the solution filtered through glass wool into a litre flask till the washings were colorless. It was then diluted to 1000 c.c. with distilled water, and three estimations of the unreduced permanganate were made as follows:

(*a*) 30 c.c.	required	21·8 c.c.	oxalic sol.	to complete decolorization.
(*b*) 50 c.c.	"	36·25 c.c.	"	"
(*c*) 50 c.c.	"	36·3 c.c.	"	"
130 c.c.	"	94·35 c.c.	"	"

Then $\frac{130\times3\cdot096}{1000}$ = ·40248 gm. ($K_2Mn_2O_8$) calculated, and 94·35 × ·00332 = ·313242 gm. ($K_2Mn_2O_8$) found, equivalent to 77·82 per cent.

This pill-mass was only kept about half the time the former had been, but the results (while not strictly comparable) show that if the pills are freshly dispensed with a minimum quantity of excipient, and not coated with a reducing medium, Martindale's mixture practically answers its purpose.

Estimation of unreduced salt in a pill-mass containing chloride of gold and sodium (sodium chlor-aurate).—The gold salts employed were obtained from a firm well known as manufacturers of fine and rare chemicals, but it was considered desirable for the purpose of the following investigations to ascertain beforehand the exact percentages of metal and chlorine contained in each. For this purpose a small quantity of the contents of the 15 grain tubes was weighed off for the estimation of gold and chlorine, whilst the remainders were also weighed off at the same time (to avoid deliquescence), and worked up into pill-masses. All the gold estimations were made by reduction with oxalic acid in slight excess, whilst the chlorine in the filtrate from the precipitated metal was estimated gravimetrically by precipitation with $AgNO_3$ in presence of a large excess of HNO_3 in order to prevent any argentic oxalate from precipitating with the chloride. It was noticed in shaking out the salt ($NaAuCl_4.2H_2O$) that the crystals seemed moist, and the somewhat low percentages found may perhaps be accounted for by this fact. ·420 gm. of sodium chlor-aurate was taken. This gave ·200 gold and ·13892 chlorine. The following are the percentages found with those calculated for $NaAuCl_4.2H_2O$:—[1]

Calculated.		Found.
Na = 5·8		
Au = 49·47		47·619
Cl_4 = 35·67		33·076
$2(H_2O)$ = 9·06		
100·00		

[1] Au = 196·2, Ag = 107·66, Na = 22·995, O = 15·96, N = 14·01, Cl = 35·37, H = 1. 'Die Atomgewichte der Elemente.' (Meyer and Seubert.)

In making the pill-mass, the question of doses (1-30th to 1-10th of a grain, U.S.P.) had to be considered in framing a working formula which would approximately represent what would actually occur in the pharmacy if a prescription containing the remedy were required to be dispensed. The following formulæ were adopted :—

(*Hypothetical Prescription.*)

℞ Auri et sodii chloridi gr. $\frac{1}{15}$.
Excipientis (Martindale).....q. s.
Fiat pilula secundum artem. Mitte, 30.

(*Working Formula.*)

Chloride of gold and sodium 1 part.
Paraffin wax.....2 parts.
White vaseline.....4 parts.
Washed kaolin.....6 parts.

The wax and vaseline were melted together, and the gold salt rubbed down with the kaolin till it was thoroughly divided, then the whole was beaten up into a pill-mass with the requisite quantity of wax and vaseline mixture. One part of salt is contained in every 13 of mass, and to dispense the above prescription, 26 grains of mass would be required for the thirty pills ordered, thus making each pill weigh just under 1 grain. The pill-mass was made May 22, 1885, according to the above working formula, and estimated November 18, 1885, consequently it had been kept nearly six months (one hundred and eighty days). 7·83 gm. were weighed off for estimation, equalling ·6023 of incorporated gold salt. The mass was carefully rubbed down with distilled water at the ordinary laboratory temperature, and the resulting solution filtered through a long column of moist asbestos, which had previously been washed with HNO_3 and distilled water till free from any traces of chlorine. By this means all the finely suspended kaolin was removed and the clear solution made fit for gravimetric estimation. The *débris* of the pill-mass (kaolin, vaseline, etc.), together with the asbestos filter, were washed with distilled water till chlorine ceased to be detected in the liquid which passed through. The filtrate was evaporated to a low bulk, and $\frac{1}{2}$ gm. of oxalic acid dissolved in a little distilled water added. After standing a few days, the precipitated metallic gold was collected on a quantitative filter, washed, dried and incinerated. It weighed (less ash) ·105 gm. This is equivalent to ·2205 gm. of the sample of $NaAuCl_4 2H_2O$ used, or 36·6 per cent. of the gold salt, which was originally incorporated in the mass. A reduction equal to 63·4 per

cent. had therefore taken place. Owing to an accident to the filtrate the chlorine was not estimated.

Estimation of unreduced salt in a pill-mass containing acid chloride of gold (hydrogen chlor-aurate).—In the gold and chlorine estimation, ·3605 gm. of salt was used. The *modus operandi* in this case was similar to the preceding estimation of the sodium chlor-aurate, and a total yield of ·174 gm. metallic gold and ·503 gm. argentic chloride was obtained. The percentage results calculated for $HAuCl_4.4H_2O$ agree well with theory:—

Calculated.		Found.
H =	·24	
Au =	47·8	48·266
Cl =	34·46	34·5
$4(H_2O)$ =	17·5	
	100·00	

In making the pill-mass, the following formulæ were used, having regard to the probable dose (1-30th to 1-20th of a grain):—

(Hypothetical Prescription.)

℞ Auri perchloridi (acidi).....gr. $\frac{1}{20}$.
Excipientis (Martindale).....q. s.
Fiat pilula secundum artem. Mitte 20.

(Working Formula.)

Acid chloride of gold.....1 part.
Paraffin wax.....3 parts.
White vaseline.....6 parts.
Washed kaolin.....9 parts.

The mode of mixing was the same as in the preceding case. One part of salt is contained in 19 of mass, so that 19 grains of the latter would make twenty pills, containing 1-20th of a grain in each. The mass itself was made June 3, 1885, and estimated January 13, 1886. It had been kept, therefore, about seven and a half months (two hundred and twenty-four days). 7·6015 gm. of mass were taken for analysis, equivalent to ·4 gm. of the salt ($HAuCl_4.4H_2O$). The treatment was similar to that of the preceding sodium chlor-aurate pill-mass, and the total weights of precipitated metallic gold and silver chloride obtained were ·0305 gm. and ·2715 gm. respectively. The gold found (·0305 gm.) is only equivalent to ·0638 gm. ($HAuCl_4 4H_2O$) or 15·95 per cent. of that actually incorporated in the mass. The reduction (84 per cent.) is considerably more than was expected from the appearance of the mass before estimation. The silver chloride found (·2715 gm.) is equivalent to ·06713 gm. of

chlorine, or 48·68 per cent. of that incorporated in the mass as hydrogen chlor-aurate. These results prove the presence of a considerable amount of free hydrochloric acid in the mass, as the amount of chlorine dissolved out as gold salt ($HAuCl_4 4H_2O$), and therefore part of the total 48·68 per cent. found, is only equal to ·021993 gm. or 15·94 per cent. of the total originally combined with the excipient as hydrogen chlor-aurate. Whether the 15·32 per cent. of chlorine which remains unaccounted for, had combined to form additive or substitution products with the olefins probably contained in the mixed paraffins, or whether it was altogether dissipated, has not yet been ascertained. The mode of its disappearance, while not essential to the purpose of the preceding inquiry, yet remains of some interest from a chemical point of view.

The conclusions to be drawn from the investigations mentioned in this paper, and those published July 12, 1884, are that Martindale's mass may be pronounced perfect as an excipient for silver salts, of which argentic nitrate may be cited as a type.[1] Practically, it can also be said to answer its purposes for permanganate of potassium, particularly if the pills are recently dispensed with a minimum quantity of excipient. That it appears to fail somewhat conspicuously in the unstable chlorine compounds of gold is probably due to the relatively large quantities of the excipient used, viz.: 12 parts of excipient to 1 of sodium chlor-aurate, and 18 to 1 of hydrogen chlor-aurate. With a little dispensing ingenuity the total quantity required could be considerably decreased, thus probably increasing the available percentage of unreduced salt in the pills, which should always be made up only as required for use. Those who can recall to memory the unsatisfactory methods of dispensing the unstable compounds mentioned in this paper before Mr. Martindale suggested the excipient which now bears his name, will readily admit that the thanks of all dispensers and therapeutists who have to deal with them are due to that gentleman for his scientific foresight and generosity in advocating and publishing formulæ for general use on the dispensing counter. The excipient is not yet perfect, however, but the dispenser may not have long to wait before the difficulty which is at present experienced in purifying the commercial paraffin compounds from a series of lower homologues will be overcome.—*Phar. Jour. and Trans.*, May 15, p. 957–958.

[1] See *Pharmaceutical Journal* for July 12, 1884, p. 21. Am. Jour. Phar. 1884, p. 437

GLEANINGS FROM FOREIGN JOURNALS.

By George H. Ochse, Ph.G.

To Distinguish Oleomargarin from Butter J. Horstler recommends the following procedure: A piece of oleomargarin the size of a hazelnut is placed in an epouvrette and the end made air-tight. Into another epouvrette a like quantity of butter is treated in the same way. When both epouvrettes are held in the hand the oleomargarin soon liquefies, forming a clear solution, whilst butter requires double the time for solution, and when dissolved is not so clear as the oleomargarin solution. When the tube is filled one-third full with ether the oleomargarin is easily dissolved and does not produce any turbidity or precipitate on the addition of alcohol. Butter when treated in like manner yields a precipitate.—*Pharm. Rundschau*, xii, p. 225.

Tyrotoxicon, a ptomaine extracted from poisonous Cheese.—Vaughan has isolated a ptomaine from poisonous cheese by treating the cheese with water; the aqueous solution is acidulated and a slight excess of caustic soda added, agitated with ether and the ethereal solution allowed to evaporate spontaneously; the residue is again treated with water and shaken with ether, and the ethereal solution evaporated in presence of sulphuric acid, when acicular crystals are formed. Tyrotoxicon, when placed on the tongue, produces an acrid and burning sensation, soon followed by dryness of the throat and nausea. The smallest quantity, when absorbed, produces diarrhœa. It reduces iodic acid, but is not precipitated by the ordinary reagents for alkaloids; water, alcohol and ether dissolve it. When exposed to the air it loses its crystalline form, an acid product remaining.—*Journal de Pharm. et de Chimie*, 1886, 409.

Selenium Iodide.—Guyot prepares selenium iodide by adding an excess of selenium to a solution of iodine in carbon bisulphide. The filtered solution, when evaporated spontaneously, deposits beautiful gray-black crystals having a metallic aspect. These crystals consist of protiodide of selenium (Se 23·83, I 76·16). Iodide of selenium may also be prepared by heating selenium with an excess of iodine in a sealed tube by means of a water-bath. The temperature of the water-bath is sufficient to keep it liquid; on cooling it solidifies. Exposed to the air the excess of iodine is liberated, leaving the selenium protiodide as residue. If, however, the operation is conducted in a sealed and bent tube, at a higher temperature, fine black, needle-

shaped crystals of selenium biniodide are formed. Protiodide of selenium is decomposed by heat, is very soluble in carbon disulphide, forming a blood-red solution, and in chloroform. When boiled with water it is decomposed, yielding hydriodic and selenic acids, which soon liberate free iodine. Caustic alkalies and their carbonates decompose selenium iodide. It colors the skin yellow and is capable of dissolving a large quantity of iodine.—*Répertoire de Pharmacie*, 1886, p. 182.

Hypodermic Pearls.—To preserve solutions for hypodermic use some propose to dissolve the medicament in an aromatic distilled water; others propose the addition of alcohol, glycerin, salicylic acid, etc.; these additions change or modify the action of the medicament simply dissolved in water. The preparation of solutions from pellets or gelatin discs, when wanted for use, yields solutions which are neither clear nor limpid; to filter them is almost impossible, since the greater part of the liquid would be taken up by the filter. Limousin proposes to use glass pearls having a capacity of slightly more than 1 c.c., ovoid in shape and having the one end terminating in a narrow tube. The interior of the pearls is sterilized according to Pasteur's method, by submitting it to a temperature of about 200° C. The pearls are then filled and the ends sealed with an oxyhydrogen lamp. Thus kept the solutions are not affected by atmospheric influence. A solution of Bonjean's ergotin was preserved for more than a year; hydrochlorate of morphine was also preserved, becoming slightly darkened when exposed to the light. During very cold weather, should any crystals separate they can be redissolved by simply warming in a flame. The solutions should be prepared from boiling water which has been previously filtered. Limousin rarely employs distilled water for making the solutions, experience having proven that, owing to the lack of saline matter which water ordinarily contains, it is more prone to become mouldy.—*Bull. Gén. de Thérap.*, April, 1886, p. 316.

Phosphorus Pentafluoride.—Thorpe prepared pentafluoride of phosphorus by the action of trifluoride of arsenic on pentachloride of phosphorus, but was unable to free the gas from arsenic trichloride and arsenic trifluoride, nor did he succeed in liquefying it. M. H. Moissau has since obtained it in a pure state by the action of bromine on trifluoride of phosphorus ($5\ PFl_3+5\ Br_2=3\ PFl_5+2\ PBr_5$). With Cailletet's apparatus, temperature 16° C., and a pressure of 16 atmos-

pheres, Moissau succeeded in condensing the gas. Strange to say, when liquid pentafluoride of phosphorus does not affect glass. In the liquid state pentafluoride of phosphorus contains 75·398 per cent. of fluorine.—*Phar. Zeitung*, 1886, p. 216.

Synthesis of Coniine.—By the action of paraldehyde on *a* picoline, at a temperature of about 250° C., Ladenburg obtained an oil, sparingly soluble in water, and boiling at 190–195° C., which, by reduction, yielded a base having the same composition as coniine ($C_8H_{17}N$), also possessing the same odor and solubility in water, and the boiling point =166–170° C. The hydrochlorate fuses at 203° C. The double salt formed with iodide of cadmium ($[C_8H_{17}NHI]_2CdI_2$) is similar to the characteristic double salt formed with coniine. Lange's *a* picoline is obtained from pyridine, and pyridine can be obtained in several ways by synthesis, hence an accurate synthesis is wanting.—*Chem. Zeitung*, x, p. 63.

Solution of Caoutchouc.—According to Beiersdorf, gum elastic can be dissolved in ether by the addition of a small quantity of oleic acid. The resulting solution, when applied to the skin, is more elastic and more agreeable than collodion.—*Phar. Centralhalle*, 1886, p. 221.

VARIOUS BLEACHING LIQUIDS.

By G. Lunge and L. Landolt.

Chlorozon.—This substance, manufactured by passing chlorine mixed with air into caustic soda, and for which a high value as a bleaching agent has been claimed, is actually a solution of hypochlorous acid in sodium chloride, with traces of free chlorine and of sodium chlorate. Chlorous acid and chlorine peroxide are absent. Comparative experiments showed that the omission of the air-stream has no effect on its composition.

Products of the Action of Chlorine on Magnesia.—Dry or nearly dry magnesium hydroxide does not yield a bleaching powder when treated with chlorine. When chlorine is passed into a milk of magnesia at 15°, or even at 0°, more than half of the absorbed gas goes to form chlorate (with the corresponding chloride), the remainder producing hypochlorite. At higher temperatures, or on warming

the above solutions, or even passing air through them, almost all the hypochlorite is converted into chlorate, a small portion decomposing into chloride and free oxygen. Neither chlorate nor free oxygen (except traces) is formed when chloride of lime is mixed with sulphate of magnesia.

Action of Chlorine on Zinc Hydroxide.—With the solid hydroxide only a trace of a bleaching compound is formed. With the hydroxide suspended in water, both hypochlorite and chlorate are formed, the latter in smaller proportion than in the case of magnesia. Heating converts the hypochlorite partly into chlorate, but the tendency to decompose into chloride and free oxygen is greater than with magnesia hypochlorite.

The solution obtained by mixing a zinc salt with chloride of lime is less stable than the corresponding magnesian solution.

Aluminous Bleaching Liquids.—Aluminium hydroxide does not absorb chlorine. The solution obtained by double decomposition contains chiefly hypochlorite, but part of this immediately splits up into aluminium hydroxide and free hypochlorous acid.

Alteration on keeping.—Chloride of lime, and the solutions containing magnesium, zinc, and aluminium obtained from it by double decomposition, change very slowly in the dark, but on exposure to diffused daylight in closed vessels rapidly lose nearly the whole of their bleaching power.

Conversion of Chloride of Lime into Chlorate.—Simple boiling is insufficient; the formation of chlorate progresses very slowly, and more than half of the hypochlorite decomposes into chloride and oxygen. If, however, the liquor is saturated with free chlorine, 70 per cent. is at once converted into chlorate (with the corresponding chloride) in the cold, and although without heat the further progress of the change is very slow, yet on heating to boiling it is completed without loss of oxygen. Passage of chlorine during the heating is prejudicial.

Comparative bleaching experiments with the bleaching compounds of the above four metals shows that the zinc solution acts the most rapidly. The passage of carbonic anhydride for a short time, or the addition of a minute quantity of acetic or oxalic acid, accelerates the action immensely. When used in excess, the three acids seem to be about equally active.—*Jour. Chem. Soc.*, 1886, p. 399.—*Chem. Ind.*, 1885, p. 337.

RELATIONS OF THE PHOSPHATES IN URINE.

By A. Ott.

The acid reaction of urine is now known to be due to an excess of acid over normal phosphates. The author gives a series of analyses showing the relative quantities of phosphoric acid present in the urine combined in the form of acid and normal phosphates. Huppert's method of analysis was used. The urine was collected daily at 10 P.M., 8 A.M., and 2 P.M. Meals were taken after each collection of urine; dinner and supper consisting of meat and vegetables, breakfast of coffee and bread. The average of the analyses shows that the ratio of P_2O_5 combined as normal phosphate to that combined as acid phosphate was as follows: Evening urine (2 P.M. to 10 P.M.) as 91 : 100, night urine (10 P.M. to 8 A.M.) 56 : 100; Morning urine (8 A.M. to 2 P.M.) 58 : 100; or, for the total urine for 24 hours as 69 : 100.

The large amount of normal phosphates present in the evening's urine illustrates the previously known fact of the relation between the food taken and the phosphates in the urine.

Erlenmeyer (*Ber.*, ix., 1839) has shown that acid calcium phosphate is soluble in 700 parts of water. But that the urine is able to hold more than this in solution is accounted for by the presence of other salts in it, for it is known that if acid calcium phosphate and calcium chloride be mixed in equivalent quantities, a solution can be obtained in which the phosphate is dissolved in only 34·2 parts of water. Similarly it is shown that the normal phosphate is more soluble in urine than in water, salts such as potassium phosphate and sodium chloride aiding its solution.

By heating the aqueous solution of both phosphates, they are precipitated, the acid phosphate being changed into the normal phosphate, whilst phosphoric acid passes into solution. But in normal urine no such precipitate, or only a very slight one, occurs. This is accounted for again by the presence of other salts, especially magnesium phosphate, potassium phosphate, and sodium phosphate. This can be shown experimentally with the individual salts, and normal urine contains such proportions of these salts as to prevent precipitation by heat.—*Jour. Chem. Soc.*, 1886, p. 167.—*Zeitsch. Physiol. Chem.*, x., 1–10.

THE SOLUBILITY OF CARBONATE OF LITHIUM IN WATER CONTAINING CARBONIC ACID.

By A. Goldammer.

It is known that the carbonates of the alkaline earths, though nearly insoluble in water, are soluble to a considerable degree in water containing carbonic acid, and that in this respect lithium resembles them in behavior. Lithium, it is true, is soluble in water, and I have obtained results corresponding with Bewad's statement that one part is soluble in 75 parts of water at 15° C.; but, its solubility is considerably increased by the introduction of carbonic acid. This behavior of lithium carbonate has found only slight mention in technical literature, but it presents some interest in respect to the alleged existence of a solid bicarbonate of lithium.

In an experiment in which I suspended 75 gm. of finely powdered lithium carbonate in a litre of water and passed a current of carbonic acid through it during three days 5·41 per cent. by weight of lithium carbonate went into solution. When atmospheric pressure was used the solution was effected much more rapidly. In experiments where a pressure of four atmospheres was used during six hours, in one case 6·40 per cent. and in another 6·87 per cent. of lithium carbonate was dissolved. It is assumed that under greater pressure, continued during a longer time, the carbonic acid would have effected the solution of still more lithium; but from the solution prepared under the above-mentioned pressure the lithium carbonate separated out in a crystalline form immediately after filtration, whilst a solution prepared without pressure remained unaltered during several days, and, under proper conditions, a longer time.

It would be of advantage to the mineral water manufacturer if a solution of the bicarbonate of lithium could be kept unaltered; it would present many conveniences, seeing the difficult solubility of the monocarbonate. This, according to my experience, however, is only possible by maintaining the solution under pressure in a manner analogous to a solution of magnesium bicarbonate. A solution containing 5 per cent. of lithium monocarbonate will, it is true, remain unaltered for a long time, in bottles filled to the cork; but, after the removal of a part of the contents of the bottle, as well as after several openings of the cork, and especially upon a rise of temperature, a considerable quantity of lithium carbonate crystallizes out. If a

flask containing a solution be heated in a water-bath, at about 50° C., evolution of gas begins and separation of lithium carbonate. The solution shows itself more resistent to the introduction of atmospheric air; it requires a strong current to be passed through it for a considerable time before the lithium carbonate commences to separate.

Although a freshly prepared and filtered solution of bicarbonate of lithium gave, in a quantitative determination of the carbonic acid, an amount which fell only slightly below the quantity calculated for $LiHCO_3$, an older, freshly-filtered solution, from which lithium carbonate had already separated, never gave the amount of carbonic acid required for that formula. The carbonic acid found, which agreed closely in several experiments, indicated such a quantity of simple carbonate as corresponded closely to the proportional solubility of the latter.

I. A freshly prepared (filtered) solution, containing in 100 parts 12·63 parts of $LiHCO_3$, yielded 7·95 of CO_2; calculated, 8·17.

II. An old (filtered) solution, containing in 100 parts 8·53 parts of $LiHCO_3$, yielded 4·87 of CO_2; calculated, 5.52.

A freshly prepared solution of bicarbonate of lithium gives with mercuric chloride solution a strong white turbidity, which remains unaltered for a minute; whilst in a (freshly filtered) solution from which lithium carbonate has already separated, the turbidity caused by the addition of mercuric chloride is not pure white at first, and, after a few seconds, passes into a red precipitate.

From a solution of bicarbonate of lithium it is always the monocarbonate that crystallizes out, and I have not succeeded in separating bicarbonate or a sesquicarbonate. I think it necessary, considering the numerous erroneous statements to emphasize this. In very slow evaporation (in an exsiccator or standing in the air) a dense verrucose crystalline crust forms on the surface of the liquid, which, under the microscope, is seen to consist of groups of small, irregular crystals, that decrepitate when heated. In a rapid evaporation upon a water-bath there is formed, on the contrary, partially, a crystalline powder, refracting light strongly, which, under the microscope, is seen to consist of well-formed prismatic crystals, that do not decrepitate when heated. Upon covering a concentrated solution of lithium bicarbonate with a layer of alcohol there was at once a lively evolution of carbonic acid and amorphous lithium carbonate was thrown down.

After these fruitless attempts to obtain lithium bicarbonate in a dry condition, it is surprising that, nevertheless, a "lithium bicarbonicum" figures in commerce. I have purchased a sample of this commercial lithium bicarbonicum from one of our best houses and examined it. It proved to be not a bicarbonate, but a crystallized monocarbonate, corresponding exactly with that which I obtained by evaporating a solution of lithium bicarbonate in a water-bath. There no more exists a lithium bicarbonate or sesquicarbonate in the dry condition than magnesium or calcium bicarbonate.

It is probably not superfluous to remark that, in my experiments, I observed that lithium carbonate, upon being heated to redness in a glass tube or porcelain dish, very readily attacked the glass or porcelain, carbonic acid being given off. I have determined a loss of as much as 6 per cent., while so much silicic acid entered into combination with the lithium that, after dissolving the residue in dilute hydrochloric acid, the liquid became gelatinous. According to Flückiger, lithium carbonate also gives off carbonic acid on prolonged boiling with water.—*Phar. Jour. and Trans.*, May 15, p. 964.—*Phar. Centralhalle, April* 1.

INVESTIGATION OF TANNINS.

By F. Nötzli.

After some introductory remarks on the preparation and chemical constitution of the tannic acid of oak-bark, the author gives an outline of the different methods proposed for estimating the tannin in barks and other tannin materials. He then discusses at some length the methods recommended by Löwenthal, Simand, and Procter, and as an outcome of his researches, describes a modified method for estimating tannins. The process involves the use of (1) a permanganate solution containing 1 gm. of potassium permanganate per litre, standardized with iron or oxalic acid; (2) a solution of indigo prepared by dissolving 125 gms. of indigo-carmine paste in 6 litres of water, adding 400 c.c. of concentrated sulphuric acid, and filtering the mixture; (3) a gelatin solution, 20 gms. per litre, to be prepared every day, as it decomposes very rapidly; (4) dilute sulphuric acid, 1 kilo. per 10 kilos. of water; (5) pure sodium chloride; and (6) kaolin. To effect the titration, 10 c.c. of extract of bark (or 5 c.c. in case of rich barks) is transferred to a large porcelain basin and treated

with 20 c.c. of indigo solution and 1 litre of water. The permanganate solution is then added gradually (about three drops in two seconds), the mixture being stirred continually. The end of the reaction is ascertained by the change of color from light green to pure yellow. At this stage the edge of the basin exhibits a reddish tinge, the appearance of which indicates the completion of the oxidation. To analyze barks, the author proceeds as follows: 10 gms. of the bark previously dried at 100 are boiled out repeatedly with water until iron paper ceases to give a reaction indicative of tannin. The infusion is then made up with water to 1 litre, and a portion filtered through a dry filter-paper; 5 or 10 c.c. of the filtrate is now titrated with permanganate. 50 c.c. of the filtered extract is precipitated with gelatin, salt, and kaolin, and 10 or 20 c.c. of the filtrate titrated. The permanganate values obtained are calculated into percentage of tannin contained in the bark according to Neubauer's equivalent, 63 oxalic acid = 41·57 tannin.—*Jour. Chem. Soc.*, 1886, p. 496.—*Dingl. Polyt. Jour.*, cclix.

ACTION OF SULPHURIC ACID ON OLEIC ACID.

By A. Sabaneieff.

The author has investigated the product of the action of sulphuric acid on oleic acid, employed as a mordant under the name of "alizarin oil." The oleic acid used in the experiments was prepared from oil of sweet almonds, and thoroughly purified; it solidified at 6° to a white, crystalline mass, melting at 14°; in the liquid state, it was perfectly translucent and free from any taste or smell.

Oleic acid cooled down to at least 6°, when it becomes crystalline, was treated with sulphuric acid; the reaction under these conditions is not violent, and the temperature does not rise considerably, although the products of the reaction are the same as when oleic acid is used in the liquid state. An evolution of sulphurous anhydride is rarely observed. The reddish-brown product of the reaction, when treated with water, separates into two layers, of which one consists of aqueous sulphuric acid only; the other (which on neutralization with alkali gives the so-called alzarin oil) was dissolved in ether, and subsequently treated with water, in which a portion only is soluble.

The portion insoluble in water consists partly of a solid substance,

partly of a liquid; the former being more sparingly soluble in ether was freed from the latter by washing with this solvent. This solid substance evidently consists of a fatty acid; it melts after repeated crystallization at 79°; the analytical data point to its being hydroxystearic acid, a view confirmed by determinations of the degree of saturation of the compound by means of Hübl's method (described in 1884), the hydroxystearic acid was converted into iodostearic acid (identical with Saytzeff's compound, described in 1885,) and into stearic acid. The melting point of hydroxystearic acid, as determined by the author, differs somewhat from the data of former investigators (varying from 56° to 85·5°).

The liquid substance, after repeated washing with alcohol, gives a liquid residue which seems to be the anhydride of hydroxystearic acid; it is also obtained by heating the acid at 130–150°. It does not combine with bases, is sparingly soluble in alcohol, and is converted into the acid by boiling with alkalis; an attempt to convert the anhydride into the corresponding amide failed. The substance extracted by alcohol from the liquid portion contains in addition to a certain quantity of this anhydride and of hydroxystearic acid, an unsaturated liquid fatty acid, which seems to be unaltered oleic acid.

The portion of the product soluble in water was found to consist of sulphohydroxystearic acid, as proved by analysis of its copper salt, and by determination of its degree of saturation by Hübl's method. This sulphonic acid is easily decomposed, especially by heating it on the water-bath with hydrochloric acid, into hydroxystearic and sulphuric acids. Its aqueous solution always retains a certain amount of oleic and hydroxystearic acids and the anhydride of the latter.

On the whole, the experiments show that the duration of the reaction between oleic and sulphuric acid does not influence the quantity of sulphonic acid formed, 20 per cent. of the oleic acid being obtained as a rule in the form of this compound: 7·5–15 per cent. remain unchanged, and 70 per cent. is converted into hydroxystearic acid and its anhydride. These data, as well as the non-formation of sulphurous anhydride, do not agree with the explanations of this reaction, proposed by former investigators (Müller-Jacobs, Liechti and Suida, Lukianoff); the author considers it most probable that the action of sulphuric acid on oleic acid consists of a series of simul-

taneous processes, partly yielding compounds of the two acids, not decomposed by water and dissolving therein, partly giving substances decomposed by water, which converts them into the insoluble substances described in the present paper.—*Jour. Chem. Soc.*, 1886, p. 442.—*J. Russ. Chem. Soc.*, 1886.

ON THE ESSENTIAL OIL OF LIME LEAVES (CITRUS LIMETTA). Preliminary Notice.

By Francis Watts, F.C.S.,
Chemist to the Montserrat Company, Montserrat, W. I.

The leaves and young shoots of the lime tree yield a fragrant yellow oil by distillation with water or in a current of steam. About 230 c.c. were prepared for the purpose of the present investigation.

The oil is moderately soluble in rectified spirit of wine, and has a sp. gr. = 0·8777 at 33° (water at 4° = 1). When agitated with soda solution, no appreciable diminution of volume was observed.

The oil was submitted to fractional distillation, and the several fractions were agitated with a strong solution of sodium bisulphite. It began to distil at about 170°, and the portion which passed over at this temperature did not combine with the bisulphite. It consisted of a hydrocarbon. On the other hand, the fraction obtained at 220–230° formed a crystalline mass with the bisulphite. But as this fraction had no action, or but very slight action, on silver nitrate, it was inferred that it consisted of a ketone, rather than an aldehyde.

About one-third of the original oil boils at a temperature above 280°, has a viscid consistence, and exhibits a green fluorescence. It has, in fact, the appearance of colophene, and may possibly have been produced, at least in part, by the action of heat in the course of distillation.

From the lowest fractions, after digesting with sodium, a hydrocarbon was separated, boiling at 176–177°, inactive to polarized light, and having a refractive index at 30° of 1·4611 for red light. This compound unites with hydrogen chloride, forming a hydrochloride which melts at 49–50° in an atmosphere of hydrogen chloride. It also gives Riban's color reaction with ferric chloride. Except with regard to its action on polarized light, this hydrocarbon resembles the citrenes.

From the action of sodium on the lower fractions of the original

oil, and the production of a deep purple coloration when hydrogen chloride is passed into them, the presence of terpinol is rendered very probable. It was not found possible to isolate it.

In order to determine the constitution of the ketone already referred to, it was oxidized by means of chromic mixture. Abundance of acetic acid was produced, and pelargonic acid was recognized by means of its copper salt. These facts, coupled with the boiling point (220–230°) of the compound, and the peculiar smell of pelargonium oil noticeable in some of the fractions, prove that the substance is methyl nonyl ketone, $CH_3 \cdot CO \cdot C_9H_{19}$.

The watery alkaline solution resulting from the first washing of the original oil was found to contain acetic acid, and the liquid submitted to distillation smelt strongly of amylic acetate. The quantity of this compound was, however, too small to admit of its separation.

From these results, it would appear that the principal constituents of the oil of lime leaves are, a citrene (b. p. 176° *circa*), terpinol ($C_{10}H_{17} \cdot OH$), methyl nonyl ketone, and a colophene.—*Jour. Chem. Soc.*, 1886, p. 316.

MORPHINE LACTATE.

By D. B. Dott.

This salt crystallizes from its aqueous solution in four-sided prisms, in this respect resembling all the other morphine salts which I have examined. A quantity of the crystallized lactate was dried on blotting paper and exposed to the air for three days, by which time it appeared to be dry. The air-dry salt was analyzed as follows:—

(1.) 15·245 grs. exposed in water-bath lost 0·10 gr. = 0·655 per cent. This loss in weight is manifestly due to adhering moisture. On transferring the salt to an air-bath kept at a temperature of 110° C., the weight decreased very slowly, the substance darkening in color at the same time. Even after several hours the weight had not become constant, and the loss amounted to only a fraction of a per cent. The dried salt, on being now treated with water, left undissolved a considerable portion of dark amorphous matter, showing that decomposition had taken place, to which the loss in weight was undoubtedly due.

(2.) 29·02 grs. of the air-dry salt were dissolved in about half an ounce of warm water, and ammonia added in slight excess. After

eighteen hours the precipitate was collected on a filter, washed with cold water, dried under 100° C., and weighed in clasped watch glasses. Weight of precipitate = 23·13 grs. = 79·70 per cent. The theoretical yield of morphine hydrate from anhydrous morphine lactate is 80·80. This difference of about 1 per cent. is just what one would expect on account of the loss in mother-waters and washings. We may therefore affirm from these results that morphine lactate as crystallized from water, has the composition $C_{17}H_{19}NO_3$, $C_3H_6O_3$. So far as I am aware, this is the only salt of morphine which crystallizes from water as an anhydrate. It may here be noted that the dose of the lactate is the same as that of the muriate.

The solubility in water and in alcohol was next determined. Portions of the salt were digested in these menstrua at a temperature slightly under 60° F. for four hours, then for half an hour at 60° F. with frequent agitation. The filtered solutions were then weighed, evaporated to dryness, and the residues taken as the quantity dissolved.

(*a*) Solubility in water.

$$\frac{100{\cdot}70 - 11{\cdot}255}{11{\cdot}255} = 7{\cdot}94$$

One part morphine lactate is soluble in 8 parts water at 60° F.

(*b*) Solubility in 85 per cent. alcohol.

$$\frac{111{\cdot}98 - 1{\cdot}20}{1{\cdot}20} = 92{\cdot}31$$

One part morphine lactate is soluble in 93 parts rectified spirit at 60° F.

I have to thank Messrs. J. F. Macfarlan & Co. for kindly permitting me to publish this note.—*Abbey Hill Chemical Works, Edinburgh.* —*Phar. Jour. and Trans.*, May 15, p. 958.

DERIVATIVES OF PAPAVERINE.

By G. Goldschmiedt.

Papaveraldine, $C_{20}H_{19}NO_5$, is obtained by gradually adding a 2 per cent. solution of potassium permanganate to 25 gms. of papaverine, previously treated with sufficient sulphuric acid to form an acid salt and dissolved in 1 litre of water. The quantity of permanganate required is about 50 gms. The precipitate is washed with water and extracted with alcohol several times. The yield is over 50 per cent. of the theoretical. It forms a yellowish crystalline powder, which melts at 210°, is insoluble in water, readily soluble

in glacial acetic acid and in moderately dilute mineral acids; the best solvent is chloroform. When treated with concentrated sulphuric acid, it acquires a yellowish-red color, which becomes dark violet when the solution is warmed. The *hydrochloride*, with $2\frac{1}{2}$ mols. H_2O, forms long, lustrous, slender, yellow crystals; the *acid sulphate* crystallizes in long, slender, lemon-yellow needles. Both salts are decomposed by water. The *plantinochloride*, with 1 mol. H_2O, forms small, lustrous, orange-colored prisms. The *phenylhydrazine-compound* crystallizes from dilute alcohol in small reddish aggregates; it melts at 80–81°.

Dimethoxycinchoninic acid, $C_{12}H_{11}NO_4 + 2H_2O$, is formed in small quantities in the preparation of papaveraldine, and is best obtained by oxidizing 10 gms. of papaverine with a 5 per cent. solution of 50 gms. of potassium permanganate. It forms yellowish needles, which melt at 200–205° with effervescence, and is readily soluble in alcohol and hot water. The *ammonium salt* is readily soluble. The *hydrochloride* forms yellow, slender, lustrous needles; the *plantinochloride* crystallizes in groups of needles. An estimation of methoxyl-groups by Zeisel's method showed that the acid contains two such groups. When boiled with hydriodic acid, and the product steam-distilled with zinc-dust, quinoline is obtained.

In the oxidation of papaverine to papaveraldine, small quantities of the following are formed besides dimethoxycinchonic acid: *a*-pyridinetetracarboxylic, veratric, hemipinic, and oxalic acids, and (?) meconin.

Papaveroline, $C_{16}H_{13}NO_4$, is prepared by boiling papaverine with an excess of hydriodic acid. About half of the hydriodic acid is then distilled off, and the residue on cooling deposits crystals of the hydriodide of the new base. This crystallizes from water in almost colorless small needles with 2 mols. H_2O. The free base is obtained by decomposing the hydriodide with sodium carbonate solution under a layer of ether, taking care to avoid an excess of carbonate. It forms white crystals which soon become dark when exposed to air.

When papaverine is fused with potash in a closed retort, dimethylhomopyrocatechol and methylamine distil over, whilst the residue is found to contain 3:4 dihydroxybenzoic acid, and a small quantity of oxalic acid.

The *phenylhydrazine-compound* of papaveric acid, $C_{22}H_{21}N_3O_6$, crystallizes in bright yellow needles, melting at 190°.

The results of the experiments described in this and the preceding papers of the author point to the following constitution for papaverine:—

$C_9NH_4(OMe)_2 \cdot C_6H_2Me(OMe)_2$ [Me : OMe : OMe = 2 : 5 : 6].

The author hopes soon to be able to determine the positions of the two methoxyl-groups in the quinoline nucleus.—*Jour. Chem. Soc.*, 1886, p. 478.—*Monatsh. Chem.*, vi., 954.

POLYGONUM HYDROPIPER.[1]

In the last number of this Journal, we notice a paper on the active principle of this drug, by C. J. Rademaker, M. D., in which he severely criticizes an analysis made by us, and published in this Journal January, 1885. We cannot resist calling attention to the following statement:

1st. In 1871, Dr. Rademaker claimed to have discovered the active principle of Polygonum Hydropiper (see this JOURNAL) by a process which, as we showed, would certainly yield tannic acid, or a mixture of tannic and gallic acids. This part of our paper he in no way questions.

2d. He now offers, in place of the process published in 1871, a very different method. Whether or not this new process will yield the so-called polygonic acid, we do not care at present to say, except to call attention to the fact that the only evidence offered is a drawing of the crystals, as they appear under a microscope, showing 700 diameters.

3d. It is almost unnecessary to remind the readers of this Journal, that it is very poor chemistry to judge of the unknown constituents of a plant by its physiological action, or by the appearance of an ether residue under the microscope.

4th. No evidence is offered of the "imperfect manipulation" of which he accuses us; and we *did not say* (as he quoted us) that our drug was collected by *an expert* botanist.

6th. If Dr. Rademaker will send 10 grams of the so-called polygonic acid, *prepared by the process published* in 1871, to the editor of this Journal for presentation at one of the pharmaceutical meetings, together with a full account of the method of manufacture, we have no doubt that body will appoint some one to verify it. This would be a rapid and satisfactory way of ending the discussion. Until then, we see no reason for recalling a single statement made by us.

7th. We do *not* say that the process offered in his last paper will not produce a new acid, although we confess we believe it doubtful, and ask for more evidence than physiological action and microscopic crystals.

HENRY TRIMBLE.

PHILADELPHIA and SAN ANTONIA, TEXAS, June, 1886. HERMAN J. SCHUCHARD.

A New Caustic made of benzol and calomel, has proved useful in epithelioma. The pain is said to be slight and brief.—*N. E. Med. Monthly*, May, 1886.

[1] This paper came to hand just as we were going to press,—too late to have it inserted among the original articles.—EDITOR AMER. JOUR. PHAR.

VARIETIES.

Large Doses of Strychnine have been given by Dr. Lardier (*Jour. Méd. Chir. prat.*) in the treatment of delirium tremens. In one case ·005 gm. (gr. $\frac{1}{12}$) of strychnine, given every two hours for several days, produced little or no effect; but, on increasing the dose, and using the alkaloid also hypodermically, until 0·10 gm. (gr. $1\frac{1}{2}$) had been given in twenty-four hours, refreshing sleep was produced without any symptoms of strychnine poisoning.

Scopoleine as a Mydriatic.—Pierd'Houy describes the alkaloid of *Scopolia japonica*, and claims for it a stronger mydriatic action than is obtainable from atropine. Clinically the use of the drug was found to be exempt from the discomforts observed in the exhibition of atropine. Its action is described as being very rapid, and, therefore, adapted to cases in which an immediate ophthalmoscopic examination is desirable.—*Les Nouv. Remèdes*, Feb. 1, 1886; *Med. News*, April 3.

Hydrobromate of Coniine.—The variations in the quality of curare, and the consequent difficulty of adjusting the dose, have led Schulz and Peiper (*Arch. f. exp. Pathol. u. Pharm.*, xx.) to experiment with hydrobromate of coniine as a substitute in the treatment of tetanus, rabies, and the like. Thus far, they have tried it only on animals tetanized with brucine, and they find that, whether given before or after the brucine, it has a decided effect in mitigating the convulsions, and especially that it relieves the breathing.—*N. Y. Med. Jour.*, May 1, 1886.

Tablets of Nitro-glycerin.—Among the errors of the last British Pharmacopœia, the ordering of nitro-glycerin to be dispensed in chocolate tablets is perhaps the worst. Not only is the dosage uncertain, and the manipulation required dangerous, but this method of administration is slower in action and exceedingly expensive; in fact, it is difficult to conceive why the compilers should have gone out of their way to choose so inconvenient and impracticable a vehicle, when the one per cent. solution of the drug, which has been in general use for a considerable period, was open to them. It is stable, easily gauged, of prompt action, and has, in fact, all the merits which are conspicuous by their absence in the present formula. The tablets in question are not stamped, and bear no indication of their nature and strength, and mistakes which might be dangerous in their results may easily occur.—*Med. Press.*

AMERICAN PHARMACEUTICAL ASSOCIATION.

The Thirty-Fourth Annual Meeting will convene in the city of Providence, R. I., on the first Tuesday, the 7th of September, 1886, at 3 o'clock, P.M. All local Associations of Pharmacists are entitled to accredit five delegates, and should send the credentials to the Permanent Secretary—John M. Maisch—at least two weeks in advance of the meeting. Delegations from Colleges of Pharmacy and State Pharmaceutical Associations, may appoint one of their number to serve on the Nominating Committee; considerable time would be saved if these appointments were communicated to the Permanent Secretary, during the morning preceding the first session.

Applications for membership, accompanied by the fees, should be sent as

early as possible to the Chairman of the Committee on Membership—Geo. W. Kennedy, Pottsville, Pa.

It is confidently expected that arrangements will be perfected so as to afford ample time for the reading and discussion of papers, and all members are urged to forward their essays as early as possible to the Chairman of the Committee on Papers and Queries—Prof. J. U. Lloyd, Cincinnati.

Attention is also directed to the *Centennial Fund*, the interest of which is to be used for defraying the expenses of suitable investigations (see Chapter VII of By-Laws of the Council). Members desiring to avail themselves of this fund will please make application to one of the members of the committee, which consists of the President, Joseph Roberts, Baltimore, Md.; the Chairman of the Finance Committee, S. A. D. Sheppard, Boston, Mass.; and the Permanent Secretary, J. M. Maisch, Philadelphia, Pa.

The Committee on Arrangements, of which the Local Secretary, Mr. Wm. B. Blanding, is chairman, is endeavoring to provide for the accommodation and comfort of members and visitors, while traveling to, and during their stay at the place of meeting. Further particulars will be announced in a circular from the Permanent Secretary. JOSEPH ROBERTS, *President.*

BALTIMORE, June 15, 1886.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Alabama Pharmaceutical Association.—The annual meeting was held at Birmingham, May 11, and the next meeting will be held in Mobile, on the second Wednesday of May, 1887. A. L. Stollenwerck, Birmingham, was elected President; P. C. Candidus, Secretary, and W. F. Punch, Local Secretary.

The East Tennessee Pharmaceutical Association, which was organized last year, met in Knoxville, May 11th, and after transacting the business before it, adjourned to meet in 1887, on the second Tuesday of October, at Cleveland. Its officers are: G. Albers, Knoxville, President; M. Block, Chattanooga, and E. W. Tedford, Maryville, Vice-Presidents, and J. G. Rawlings, Chattanooga, Secretary and Treasurer.

The Illinois Pharmaceutical Association held its seventh meeting in Rockford, June 8th to 10th, President Patterson in the chair. Besides the President's address, and the reports of the officers and committees and of the Pharmacy Board, a number of papers were read, among them one on "The Value of Botany to Pharmacists," by Prof. Bastin; "Pressed Herbs," by C. B. Allaire; "Preservation of Alkaloidal Solutions," by Prof. Stuart; "Products of Orange Culture, and Medicated Waters," by L. C. Hogan. The new officers are: President, B. F. Gardner, Atlanta; Vice-Presidents, F. A. Druehl, Chicago; A. Shumway, Lanark, and J. S. Green, Morrison; Treasurer, G. H. Sohrbeck, Moline; Secretary, L. C. Hogan, Englewood. The next meeting will be held in Decatur, the date to be fixed by the Executive Committee.

The Indiana Pharmaceutical Association held its fifth meeting at Lafayette, June 8th and 9th. Besides the usual addresses and official reports, a number of papers were read, various questions of local and general interest were discussed, and a visit was made to the Purdue University, more especially to the Department of Pharmacy. The officers elected are: President, Leo Eliel, South Bend; Vice-Presidents, Dav. Hilt, Lafayette; N. Jay, Stockwell,

and G. H. Loesch, Indianapolis; Treasurer, J. N. Hurty, and Secretary, F. Hereth, both of Indianapolis. Richmond is the place of the next meeting.

Kansas Pharmaceutical Association.—The seventh meeting took place at Emporia, June 9th and 10th. The President, officers and committees presented their reports, and Prof. L. E. Sayre reported on the progress made in the department of Pharmacy, which was opened in the State University last fall. The liquor question, in its relation to and influence upon Kansas pharmacy, was the theme of several papers and much discussion. Papers were read by Prof. O. A. Wall, on "Apprentices;" by Prof. Sayre, on "Scale Pepsins," and by R. J. Brown, on "Kansas Plants." Prof. Sayre was elected an honorary member. The officers for the present year are: President, W. C. Sears, Burlington; Vice-Presidents, R. S. Drake, Beloit, and M. S. Griffin, Nortonville; Secretary, J. T. Moore, Lawrence; Assistant Secretary, D. Holmes, Topeka, and Treasurer, C. D. Barnes, Abilene. Next meeting at Wichita, on the first Wednesday of June, 1887.

The Maryland Pharmaceutical Association held its fourth annual meeting in the chamber of delegates, capitol building in Annapolis, June 1st. A steamer had been chartered, which conveyed most of the members, many of them accompanied by ladies, to the place of meeting after a pleasant sail from Baltimore. President Dr. E. Eareckson presided. The president's address, and the reports of officers and committees were read and discussed; that on trade interests dealing largely with the question of the liberal coinage of silver. The Committee on Legislation explained the difficulty encountered in securing the passage of a State pharmacy law, and it was then resolved that the draft of such a law be communicated to every pharmacist in the State, at least two months before the next annual meeting, so as to have it freely and intelligently discussed next year, before again submitting it to the legislature. The membership of the Association embraces about one-fourth of the druggists of Maryland; a number of new members were admitted, and Messrs. Charles. A. Heinitsh and J. M. Maisch were elected honorary members. Several papers were read by titles, and referred to the Executive Committee, and Prof. Simon gave a very interesting outline of his paper on the aims and objects of modern chemistry. Greetings were exchanged with several State Associations then in session, and delegations were appointed to the meetings of the pharmaceutical associations of adjoining States. A circular from the National Retail Druggists' Association was read, and after discussion, it was resolved that the appointment of a delegation was inexpedient. Mr. J. J. Thomsen urged the desirability of the abolishment by the United States of the *tax on alcohol* when used for manufacturing purposes, and submitted and explained a plan by which he thought the object could be accomplished. The Association approved these outlines and ordered the matter to be submitted to Congress, and to be communicated to other pharmaceutical associations. Mr. A. J. Corning, of Baltimore, was elected president, and M. L. Byers, of Hagerstown, was re-elected secretary. After the transaction of other routine business, and after passing the customary votes of thanks, an adjournment was had to Ocean City, where the next meeting will be held on the third Tuesday (19th day) of July, 1887.

After visiting the various places of historical interest and the Government institutions, the company again embarked on the steamer, which conveyed

them a considerable distance down the Chesapeake Bay, dinner and supper being served aboard. With speeches, music, singing and other entertainments, the hours passed rapidly, and late in the evening the company parted in Baltimore.

Massachusetts Pharmaceutical Association.—At the fifth annual meeting held in Boston, June 1–3, President Pease in the chair, an address of welcome by the Mayor, the President's address, and the reports of officers and committees were first made, and an appropriation, not to exceed $50, was voted in furtherance of the plan proposed for the reorganization of the National Retail Druggists' Association. Among the papers read was one by Prof. Markoe on the reaction between potassium bromide, chloral hydrate and alcohol; S. A. D. Sheppard, on business methods; J. W. Colcord, pharmaceutical education; Prof. Pengra, on new remedies; F. A. Davidson, on kaolin; H. Canning, on toilet articles; J. W. Colcord, on an improved percolator; W. C. Durkee, on calcium carbonate, and W. W. Bartlet, on milk analysis. The present officers are: H. Canning, Boston, president; J. H. Manning, Pittsfield, G. E. Fairbanks, Worcester, and W. E. Luscomb, Salem, vice-presidents; J. W. Colcord, Lynn, secretary, and F. H. Butler, Lowell, treasurer. Holyoke was selected as the place for the next meeting, which will be held on the first Tuesday of June, 1887.

Missouri Pharmaceutical Association.—The eighth annual meeting was held at Sweet Springs, June 15 and 16. President A. T. Fleischmann in the chair. The president's address dealt with various questions of importance to pharmacists, which were further considered by a special committee and subsequently acted upon by the Association. The reports of the various officers showed a cash balance on hand of $196.64, and a total membership of nearly 700, including the newly elected members. A circular from the National Retail Druggists' Association was read and referred to a committee, which recommended the appointment of a delegation to this body, and to the American Pharmaceutical Association, the report being adopted. Greetings by telegraph were exchanged with several State associations.

The following papers were read: On trade interests, by J. Richardson; on pharmaceutical legislation, by Prof. Good, and on the commercial traveler, by D. Y. Wheeler. A number of papers were also presented by Prof. Curtman, chairman of the Committee on Queries, and mostly read by title.

The amusements provided consisted of concerts and various races and tournaments.

The officers elected for the ensuing year are: A. H. Caffee, of Carthage, president; C. E. Corcoran, of Kansas City, B. O. Wood, of Monroe City, and D. Y. Wheeler, of Sedalia, vice-presidents; J. M. Good, treasurer, and G. H. C. Klie, secretary. The next meeting will again be held at Sweet Springs, on the third Tuesday of June, 1887, and it is contemplated to extend the sessions over three days. L. Kuntz, of Brownsville, is local secretary.

Nebraska Pharmaceutical Association.—The annual meeting was held at Omaha, May 11. The business transacted consisted in the reception and discussion of the reports of officers and committees, and the consideration of a proposed pharmacy law. Prof. O. A. Wall read a paper on pharmaceutical nomenclature. The next meeting will again convene at Omaha, on the second Wednesday of May, 1887. Jas. H. Reed is president; C. J. Daubach, secretary, and N. A.

Kuhn, local secretary.

New Jersey Pharmaceutical Association.—The sixteenth annual meeting took place at Newark, May 19. Several papers were read, the titles of which have not been received. Mr. J. B. Kilmer, of New Brunswick, was elected president; the treasurer, recording secretary and corresponding secretary were re-elected. Next meeting at Paterson, on the third Wednesday of May, 1887.

New York Pharmaceutical Association.—President Macmahan presided at the eighth meeting held at Rochester, June 8–10. An address of welcome by the Mayor, the president's address, and reports of officers and committees, occupied the greater part of three sessions. An appropriation not exceeding $50, was made with the view of reorganizing the National Retail Druggists' Association; and the official recognition of exhibits at the time of the meeting, was abolished. The papers read were of interest and importance, and were quite numerous. The officers elected are: C. Z. Otis, Binghamton, president; J. H. Smith, Au Sable Forks, J. Thomas, Buffalo, and R. E. Phillips, Fulton, vice-presidents; secretary and treasurer were re-elected. The next meeting will be held at the Thousand Islands Park, the date to be announced by the executive committee. R. E. Phillips, Fulton, is local secretary.

Pennsylvania Pharmaceutical Association.—The ninth annual meeting convened in the court house at Lebanon, at 2 o'clock P.M., on Tuesday, June 8th, and after holding six sessions, adjourned on Thursday. President George presided, and Dr. J. A. Miller, the secretary, was at his post. The various officers and committees presented their reports. A very elaborate report on *unofficinal formulas* was read by the chairman, C. T. George, of Harrisburg, presenting numerous formulas more or less in use, and many of them offered in the place of defective formulas of the New York and Brooklyn Formulary. The report was ordered to be communicated to the Committee of the American Pharmaceutical Association, also to be published in advance of the proceedings, in the "Pharmaceutische Rundschau" of New York. The report on *adulterations and sophistications* created considerable discussion, mainly on the sale of *oil of betula lenta* in the place of *oil of gaultheria*, the position being taken that the former should not be sold for the latter, although the two were in the main, chemically identical; the relation between these two volatile oils being similar to those of staranise and anise, and of Chinese cinnamon and Ceylon cinnamon.

The report of the Committee on Apprentices, made by the chairman Wm. B. Thompson, commented favorably on the action of the Philadelphia College of Pharmacy, which had adopted a plan matured by Wallace Procter, involving the appointment of a special committee for the purpose of examining, free of charge, young men contemplating to become apprentices of pharmacy, with the view of determining their fitness for such a course from their general education and knowledge.

The report on *pharmaceutical legislation* embraced the draft of a State pharmacy law, which had been communicated to all druggists in the State, and was now considered, somewhat amended and referred to a committee for presentation to the legislature.

A circular communication from the National Retail Druggists' Association was read and ordered to be placed on file.

A resolution was passed declaring the distribution in the meeting room of

pamphlets and trade circulars to be of questionable propriety, and prohibiting it in the future.

The following papers were read :

On Membership, a paper by M. N. Kline, showed the advantages resulting from organizations; and another by L. Emanuel, advocated the consideration of scientific questions and of commercial topics, and urged the adoption of formulas for household medicines.

The Practical Value of a Knowledge of Botany was discussed by L. Cisin. In illustration of this subject, Prof. Maisch referred to the fact that in Lebanon and some of the adjacent counties of Pennsylvania, a limited quantity of absolutely *pure saffron* was annually produced, while even the best quality of imported saffron contained admixtures of styles, stamens and corolla shreds in small proportion, and much of the saffron of commerce was grossly adulterated.

Goods on Commission was the subject of a paper by J. W. Miller. The writer expressed himself in opposition to this practice, and quoted from *Purdon's Digest* (page 652), showing that such goods may be sold for storage or any other charge after giving notice to the owners and advertising the contemplated sale.

Another paper by Mr. Miller, entitled *Neglect*, discussed the efforts made for elevating pharmacy, and the appreciation of such efforts by the public.

Apprentices, by D. Phreaner. This paper treated of the educational deficiencies of many pharmaceutical apprentices.

Mutual Fire and Life Insurance of Druggists, by J. F. Patton. The mutual feature does not commend itself, because the uncertainty and variability of the premiums, payable through the year, robs the mutual plan of that element of security and certainty which the object of insurance is designed to foster.

The Compounding by Country Physicians was the theme of a paper by J. W. Ridpath, giving some advice to village apothecaries in their intercourse with physicians.

Explosives and Explosive Mixtures, by C. D. Lippincott.

Weights and Measures, by W. L. Turner. To prepare the way for a more perfect understanding of the decimal system, and to make the several denominations readily interchangeable with the American weights, a revision of the latter is proposed, so as to make the grain the fifteenth part of the metric gram; the ounce to weigh 500 new grains, and the pound 14 new ounces, which would make the kilo equal to 30 new ounces. For the word gram the designation *weight* might be adopted. This change would make 1 weight (1 gram) = 15 grains; 1 deciweight (0·1 gm.) = $1\frac{1}{2}$ grain; 1 centiweight (0·01 gm.) = $\frac{3}{20}$ grain, and one milliweight (0·001 gm.) = $\frac{3}{200}$ grain. The relation of the present standards with the proposed new one, is shown in the following table:

1 avoird. pound	=	$453\frac{1}{2}$	weights (or gm.)	=	7000	old grains	=	6804 new grains.
1 new "	=	$466\frac{2}{3}$	" "	=	$7201\frac{1}{2}$	"	=	7000 "
1 Troy ounce	=	$31\frac{1}{10}$	" "	=	480	"	=	$466\frac{1}{2}$ "
1 new "	=	$33\frac{1}{3}$	" "	=	514	"	=	500 "

For measures of capacity the metric system might well be adopted, and if deemed desirable, the terms *litre*, etc., might be readily replaced by others of corresponding import.

Indigenous Drugs.—Geo. W. Stoeckel gave a list of drugs collected in Penn-

sylvania; the list is arranged in groups of adjacent counties, but quantities could be obtained only in few instances. Besides such staple articles, like tobacco, hops and paraffin, the following were reported as being sold in largest quantities: ginseng, burdock, elecampane, cimicifuga, mullein, kalmia, hepatica, stramonium, spearmint, peppermint, marjoram, flaxseed, wax, and the oils of gaultheria, sweet birch and sassafras.

Drugs and Preparations in little demand.—Prof. S. H. Stevens has collected statistics from 235 pharmacists doing business in 36 counties in Pennsylvania, from which it appears that there is little demand for 610 out of the 997 drugs and preparations of the pharmacopœia, namely: For 11 abstracts, 3 vinegars, 9 acids, 4 waters, 4 cerates, 2 papers, 2 confections, 2 collodions, 2 decoctions, 12 plasters, 78 extracts and fluid extracts, 4 infusions, 5 liniments, 5 lithium salts, 8 mixtures, 4 mucilages, 2 oleates, 6 oleoresins, 18 oils, 5 pills, 8 potassium compounds, 12 sodium salts, 3 spirits, 15 syrups, 27 tinctures, 74 troches, 13 ointments, and 4 wines, the remainder being vegetable and animal drugs.

Commercial Tartaric and Citric Acids.—Prof. Trimble examined six commercial samples of tartaric acid, which contained between 99·45 and 99·90 per cent. of $H_2C_4H_4O_6$, ·08 and ·29 of moisture, and ·009 and ·40 per cent. of ash. Only one of the samples gave indications of slight traces of lead; sulphuric acid was absent from two, present as traces in three, and present in somewhat larger proportion in one sample. (See also Am. Jour. Phar., 1885, p. 228). The three samples of citric acid examined were free from other organic acids, contained traces of sulphate and of lead, and yielded between ·065 and ·084 per cent. of ash; the percentage of $H_3C_6H_5O_7$, H_2O was 99·82, 99·96 and 101·92, the last sample having somewhat effloresced.

Annatto.—G. W. Kennedy examined 8 commercial samples, in which the moisture varied between 18·75 and 55·0 per cent., and the amount of ash between 5 and 28 per cent. A colorimetric test was made with the dried samples in alcoholic tinctures of 1 : 1000; taking the darkest colored tincture as the standard, 100, the others ranged 70, 60, 50, 50, 20, 20, 10.

Honey.—J. W. Ridpath has made numerous unsuccessful experiments with the view of preventing the crystallization of honey without making any addition; remelting at a low temperature, and keeping the liquefied honey in a moderately warm place is recommended, and a little glycerin may be added. Further experiments will be made.

The Purity of Beeswax.—J. L. Lochman reviewed the tests for detecting resins, fats, fatty acids, paraffin, water, amylaceous and mineral substances.

Oil of Camphor, by C. A. Heinitsh. During the past sixteen months 94,500 lbs. of this oil were imported into the United States; but it was impossible to ascertain in what manner it is consumed. The oil is, to a limited extent, employed in medicine, and is said to be used in the manufacture of celluloid, varnishes, paints, lampblack, and of low-priced toilet soaps; it is also stated to be employed for adulterating volatile oils, such as sassafras, cajuput, cubeb, cassia, anise, gaultheria, rhodium, peppermint, etc. No reliable tests are known for detecting such adulterations.

Petrolatum.—J. B. Duble compared three commercial specimens of soft paraffin with two more expensive ones sold under trade names, and ascertained the former to compare favorably with the latter. The pharmacopœial tests appear

to be reliable and ready methods for detecting the presence of resinous, bituminous and other organic matters.

Camphor Cerate, by C. A. Heinitsh.—Ointments and cerates, containing from 10 to 30 per cent. of camphor, are prescribed in many sections of our country, and may be used as substitutes for the so-called *camphor ice*. The pharmacopœial camphor cerate is too weak a preparation, and, having been admitted mainly for the extemporaneous preparation of *Goulard's cerate*, may well be dropped; the use of the latter being now almost obsolete.

Oleates in Officinal Ointments, by C. T. George.—Ointments, prepared according to the pharmacopœia, were treated with benzin, the filtrate evaporated, the residue dissolved in a hot mixture of chloroform 1 vol. and alcohol 3 vol., the solution placed on ice to separate stearin, and the filtrate evaporated and tested for the metals, the presence of which was shown in the case of the ointments of zinc oxide, mercury, mercuric oxide and mercuric nitrate. The amount of oleate formed was shown approximately from the amount remaining undissolved in benzin; for 240 grains of ointment the loss was for mercurial ointment, 40 grains; ointment of red mercuric oxide, 8 grains, and ointment of yellow mercuric oxide, 10 grains. Ointments of nutgall treated with benzin or oil of turpentine showed in the solution the presence of tannic and gallic acids, if made with lard, and the absence of these compounds in the solution from ointment made with petrolatum.

Concentrated Nitrous Ether, by Professor L. E. Sayre.—Attention is called to the rapid decrease of ethyl nitrite in the officinal spirit under ordinary exposure, and it is suggested that the spirit be prepared in small quantities from the concentrated ether, kept in sealed vials in a dark and cool place. Two samples of commercial concentrated nitrous ether showed the presence of 89 and 90 per cent. of crude ether.

The Yield of Extract of Nux Vomica.—Prof. Maisch corrects a statement incorrectly reported in the discussion last year. From 2200 lbs. of nux vomica, percolating with alcohol sp. gr., .835, the yield of extract was almost exactly 10 per cent., but varied in some experiments between 8.1 and 11.3 per cent. These results agree well with those of Conroy and Lyons, reported by Dr. A. B. Lyons in a paper read before the Michigan Pharmaceutical Association in 1885. Weaker alcohol yields a larger amount of extract, and infusion with hot water gives from 18 to 22 per cent. By maceration with alcohol, a much smaller amount of extract of nux vomica is obtained, as is shown by the statements of French and German authors. In preparing the tincture of nux vomica, U. S. P., the alcoholic strength of the mentruum used for exhausting the drug must be scrupulously adhered to.

Messrs. Joseph Roberts, of Baltimore, and Fred. Hoffmann, of New York, were elected honorary members.

The officers for the current year are Jas. A. Meyers, of Columbia, president; Wm. L. Turner, of Philadelphia, and J. Harris, of Hamburg, vice-presidents. Messrs. J. L. Lemberger and J. A. Miller were re-elected treasurer and secretary, and Wm. B. Thompson, of Philadelphia, was elected assistant secretary. The next meeting will be held in Philadelphia on the second Tuesday of June, 1887.

By invitation, the members and guests paid a visit to one of the furnaces of the Cornwall Iron Works, and witnessed several castings of pig iron. Visits

were also made in a body to the Miller Organ Factory and to the grounds of the Lebanon Brewing Company; and after the final adjournment, an excursion was made by rail to the famous Cornwall iron mountain, and to the picnic grounds at Mount Gretna and Lake Conewago, where—an unlooked-for thunderstorm notwithstanding—a very agreeable afternoon was spent.

The Ohio Pharmaceutical Association convened at Springfield, June 2–4. President Melville in the chair; and opened with an address of welcome by the Mayor. The address of the president, the reports of other officers and committees, and a report of the State Board of Pharmacy, were read and disposed of; and a number of papers, practical and scientific, were read, for which two prizes were awarded. The officers elected are: president, Prof. V. Coblentz, Springfield; vice-presidents, C. N. Nye, Canton, and W. D. Fulton, Bucyrus; secretary and treasurer were re-elected. Next meeting at Akron, on the second Wednesday of June, 1887.

Texas Pharmaceutical Association.—At the meeting held at Dallas, April 27th, G. H. Rice, of Baudera, was elected President, W. L. Tucker, Waco, Secretary, and E. W. Lancaster, Marshall, Treasurer. The next meeting will be held at Fort Worth, on the second Tuesday of May, 1887.

West Virginia Pharmaceutical Association.—The annual meeting, announced for June 8th, was not held, for want of a quorum.

EDITORIAL DEPARTMENT.

Theoretical Science in the Pharmacopœia.—The critical paper on "Official Pharmacy," by Mr. Rother, which is published in the present number, treats of "a new feature of a rather questionable nature," which was introduced in the last edition of the "U. S. Pharmacopœia." When it is remembered that the object of a pharmacopœia is to define the character, establish the purity and regulate the strength of medicines, its position as a law book becomes at once apparent. This character is, in the main, well preserved in our Pharmacopœia, as far as the galenical preparations and chemicals are concerned, and even the addition of formulas to the latter—though not necessary for defining the character or establishing the purity of the compounds, and which have been omitted, without detriment, from various pharmacopœias—may be defended on account of usefulness in assisting to explain tests of identity and purity. But the Pharmacopœia wisely abstains from entering upon theoretical grounds, and hence alcohol is not defined to be hydroxyl-ethane or methyl-carbonol, nor is glycerin called propenyl-alcohol, or defined to be a triatomic alcohol; nor is tartaric acid designated as dioxysuccinic acid, or its relation to erythrit, malic acid, etc., indicated.

In defining animal and vegetable drugs, the Pharmacopœia has chosen a different course. Although the characters of good rhubarb have been known for a long time, it is only recently that the plant or plants yielding it became known. Obviously, a knowledge of the botanical name of a plant is not necessary for the recognition of a drug, and this is acknowledged by the Pharmacopœia in admitting, for instance, as sarsaparilla the roots of undetermined

species of Smilax. The botanical names of plants merely serve as explanations of the officinal titles and derivation of the drugs; but they add nothing to the knowledge of the drugs themselves. Authors' names after those of the plants have been omitted in the German Pharmacopœia, and they might be dropped from that of the United States without invalidating the precision of the definitions, except in those few cases in which the botanical name admitted has been applied by different authors to different plants. But we prefer this addition, mainly, on account of uniformity.

The further addition of order and sub-order is of no possible utility for the purposes of a pharmacopœia, and adds nothing whatever to the knowledge of the drug, or to the exactness of the definition; it is simply superfluous and useless. As the classification of chemical elements and compounds belongs to the science of chemistry, so does the classification of plants belong to the science of botany; and, as every chemist of note has his own system of classification differing, more or less, from others, so has every botanist of note his own system of classification, though it may be based, in its main features, upon the system elaborated by another botanist. The affinities of small and large groups of plants frequently extend in different directions, and yet they must be arranged in a lineal series. It follows from this, that the arrangement of species belonging to one genus may be accomplished in various ways, that even the limits of genera may vary in the estimation of different botanists, and, in the same manner, the limits of tribes, sub-orders and orders, as well as their serial arrangements. The natural systems actually in use are, for the reasons stated, quite numerous, although the majority of them are now based upon either De Candolle's or Endlicher's system, variously modified by considerations similar to those underlying the natural systems which were elaborated by Jussieu, Richard, Martius, Lindley, Bentham and Hooker, and many others.

The classification, perhaps, most generally followed in the United States and England, as well as in France, is that of De Candolle, and yet it is rarely, if ever, the case, that two botanists agree in all the details. Thus the genus Krameria constitutes the type of the order Krameriaceæ, while, according to others, this order is united as a sub-order to either Polygalaceæ or Leguminosæ. One botanist regards Anacardiaceæ and Burseraceæ as distinct orders; another unites the two into the order of Terebinthaceæ, and a third extends the latter so as to include Juglandaceæ, Rutaceæ, and others. In a similar manner, Aurantiaceæ and Granataceæ are found as distinct orders or attached, the former to either Rutaceæ or Guttiferæ, and the latter to either Lythraceæ or Myrtaceæ.

We think these few examples are sufficient to show that the introduction into the Pharmacopœia of natural orders means merely the admission of names which can convey a meaning only to the student of botany; and since these names are not of a fixed and unalterable, or even universally recognized temporary value, their utility is not apparent; they are even confusing in a pharmacopœia. When the student of pharmacy is compelled to make his acquaintance with botany in a systematic manner, he will then learn that there is also significance in these names, and a practical utility, which, however, points in a direction outside of the sphere of a legal code.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

American Medicinal Plants; an illustrated and descriptive guide to American plants. By C. F. Millspaugh, M.D. New York and Philadelphia: Boericke & Tafel. Fascicle IV. Price $5.00.

With the fascicle now before us two-thirds of the work has been completed. The favorable opinion expressed in regard to the portion published before, applies also to the present part, which, among its thirty plants, comprises six of foreign origin, viz.: Ranunculus bulbosus, Ailanthus glandulosus, Capsella Bursa-pastoris, Rhamnus cathartica, Genista tinctoria and Pastinaca sativa. Among the more important inaccuracies the following should be corrected: Two alkaloids have been isolated from Menispermum canadense, viz.: berberine and menispine; while investigating the latter, Mr. H. L. Barber compared its reactions with those of menispermine, which does not exist in the drug named, but is a constituent of Cocculus indicus. The alleged great resemblance of Hambright's myricinic acid (from the bark of Myrica cerifera) to myristic acid exists in the name only. Dorstenia brasiliensis is known in Brazil as *contra-herva*, and, in some localities, also as *caapeba*, which name is also used to some extent for Cissampelos Pareira, and, more generally, for Piper umbellatum.

Contributions from the Department of Pharmacy of the University of Wisconsin, No. 2. 1886. 8vo, pp. 52.

We shall endeavor to present some of the essays to our readers, either in extenso or in abstract.

Purdue University. School of Pharmacy. Bulletin No. 1. 1886. Pp. 22.

These papers were published in the May and June numbers of the present volume.

Purdue University. School of Agriculture. Bulletin No. 7. 1886. Pp. 11.

An essay on commercial fertilizers and notes on agricultural chemistry, by Prof. Rob. B. Warder.

Methods and Machinery for the application of diffusion to the extraction of sugar from sugar cane and sorghum, and for the use of lime, and carbonic and sulphurous acids in purifying the diffusion juices. By Harvey W. Wiley, Chemist. 8vo, pp. 85. With 24 plates.

Principles and Methods of Soil Analysis. By Edgar Richards, Assistant Chemist. 8vo, pp. 66.

These two pamphlets are issued by the Division of Chemistry of the Department of Agriculture at Washington.

L'Eau de Bois et les cures dépuratives au XVIe siècle. Par A. Dubouchet. Montpellier: Boehm et Fils. 1886. 8vo, pp. 42.

The water (decoction) of wood and the depurative cures of the Sixteenth Century.

Reprint from the Gazette hebdomadaire des Sciences médicales. The wood referred to is Guaiacum. The interesting essay is to a considerable extent based upon the syphilographic researches of A. Corradi, professor at the University of Pavia.

Sixty-ninth Annual Report on the State of the Asylum for the Relief of Persons Deprived of the Use of their Reason. Philadelphia. 8vo, pp. 32.

Excerpta from the biennial report of the Board of Health of the State of Louisiana to the General Assembly, 1884-85. Jos. Holt, M.D., President. New Orleans. 1886. 8vo, pp. 44.

Comparative size of metric and old units with reference to convenience. By Fred. Brooks.—Report of the Committee on Weights and Measures. 1886. 8vo, pp. 28.

These papers were read at a meeting of the Boston Society of Civil Engineers, and are republished from the Journal of the Association of Engineering Societies, May, 1886.

International Electrical Exhibition of the Franklin Institute, 1884. Reports of Examiners. Philadelphia. 1886.

Section XXIII.—Electro-medical Apparatus. Pp. 23.

Section XXVI.—Applications of electricity to artistic effects and art productions—with which is incorporated Section XXV.—Applications of electricity to musical apparatus.

OBITUARY.

Prof. Appolinaire Bouchardat died in Paris, France, April 7th, at the age of 80 years. He was born in the Department of Yonne, in 1806, embraced the pharmaceutical profession, and was for over twenty years pharmacist-in-chief, first at the Hospital St. Antoine, and subsequently at the Hotel-Dieu. In 1852 he was called to the Chair of Physics and Chemistry in the École supérieure de Pharmacie, and for 25 years was editor of the *Répertoire de Pharmacie.* He was the author of a "Formulaire Magistral," which passed through many editions; and from 1841 to 1885, published the *Annuaire de Thérapeutique, Matière Médicale, Pharmacie et Toxicologie.* Of his numerous investigations, quite a number have been republished, entire or in abstract, in this JOURNAL, during the years 1843 to 1873.

Notice of the decease of the following graduates of the Philadelphia College of Pharmacy has been received:

D. Augustus Jones, class 1869, died at Mount Holly, N. J., May 1st, of consumption, aged 38 years.

Joseph J. Karch, class 1868, died at Lebanon, Pa., May 21st, of abscess of the liver, aged 40 years. He had been in business in his native town since 1874, and at the time of his death was a member of the Lebanon School Board and of the American Pharmaceutical Association.

Stephen F. Penrose, class 1869, died at Quakertown, Pa., May 6th, of consumption, in the 40th year of his age. Since 1871 he was a member of the American Pharmaceutical Association.

Jarvis R. Wallen, class 1869, died in Philadelphia, May 24th, aged 38 years, of obstruction of bowels. He was a member of the firm of Colburn & Co., spice manufacturers, having relinquished the drug business some years ago.

THE AMERICAN
JOURNAL OF PHARMACY.

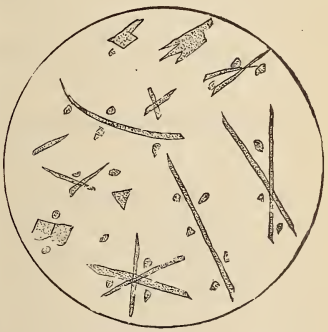
AUGUST, 1886.

PROXIMATE ANALYSIS OF STIGMATA MAYDIS.

By C. J. Rademaker, M.D., and John L. Fischer, Ph.G.

Fifty grams of stigmata maydis were treated with petroleum spirit at a boiling point below 112° F. This extracted 5·25 per cent. of a light yellow fixed oil which saponified readily with caustic potash, and solidified at a temperature of 50° F. No volatile oil was found in the petroleum extract, nor was any obtained by distillation. The oil was soluble in chlorform, ether and petroleum spirit, but was insoluble in alcohol. The action of nitrous acid upon this oil produced no change of color, but the oil solidified in a few hours.

The drug after drying was next exhausted with ether, this extracted 2·25 per cent. of solid matter; one (1) per cent. of this was soluble in water. This aqueous solution had an acid reaction, the other 1·25 per cent. proved to be resin and chlorophyll. Upon evaporating the aqueous solution to dryness, redissolving the residue in ether and allowing the ether to evaporate spontaneously, a colorless acid crystalline principle was left.



MAIZENIC ACID x700.

The original drug after being dried was then treated with absolute alcohol; this extracted 3·25 per cent. of solid matter, 2 per cent. of this proved to be resin and coloring matter, the other 1·25 per cent. proved to be an acid, identical with the acid found in the ether extract.

This acid was first discovered by Dr. Vautier (*Arch. Méd. Belges*), and he named it *maizenic acid.* It is freely soluble in water, ether and alcohol, but insoluble in petroleum spirit. It decomposes the alkaline carbonates, and its salts are crystallizable, the potash salt crystallizing in rhomboidal prisms.

To water the drug yielded 19·50 per cent. of solid matter. This was redissolved in water and then made alkaline by caustic potash. The solution was then successively treated (agitated) with ether, chloroform and petroleum spirit, but no crystalline principle was obtained. The aqueous extract consists principally of sugar, gum and extractive matter.

That portion of the drug that was insoluble in water, gave to a 2 per cent. solution of caustic soda, 3·50 per cent. of solid matter, consisting of albuminoids, phlobaphene, etc., and to a 2 per cent. solution of hydrochloric acid, the drug gave 5·50 per cent. of salts with a small amount of extractive matter.

Upon bleaching the final residue, washing and drying, 37 per cent. of cellulose was obtained.

Another portion of the drug yielded 20 per cent. of moisture. The following shows the amount of the most important constituents:

Fixed oil	5·25 petroleum spirit extract.
Resin, crystalline principle and chlorophyll	2·25 ether extract.
Resin, crystalline principle and chlorophyll	3.25 alcohol extract.
Sugar, gum and extractive	19·50 water extract.
Albuminoids, phlobaphene, etc	3·50 from alkaline solution.
Salts and extractive	5·50 from acid solution.
Cellulose	37·00
Water	20·00
	96·25

Louisville, July 4, 1886.

INVESTIGATIONS OF THE BARK OF FRAXINUS AMERICANA, *LIN.*

In 1882 Howard M. Edwards reported having obtained evidence of the presence of an alkaloid in the bark of the American white ash (Am. Jour. Phar., 1882 pp. 99 and 283). A further examination of this principle has been made during the past year, and two theses were presented last winter to the Philadelphia College of Pharmacy, from which the following brief abstracts are made:

George W. J. Hoffman, Ph.G., used for his experiments the trunk bark, deprived of the suberous layer. A decoction was made of 24 troy ounces of the bark with water acidulated with hydrochloric acid; milk of lime afforded a light green precipitate, which was washed, dried and powdered; it yielded nothing to hot alcohol or ether. On treating with diluted alcohol, acidulating the filtrate with sulphuric acid, treating with animal charcoal and evaporating, a few

light brownish crystals were obtained, containing calcium sulphate and giving very slight reactions with Mayer's reagent and with solution of iodine. By precipitating the filtrate from the lime precipitate with tannin, and decomposing with sulphuric acid, a calcium salt was obtained, but no indications of an alkaloid.

A tincture was made with 20 per cent. alcohol, and evaporated; the residue treated with strong alcohol left a gummy matter behind, the filtrate was concentrated, mixed with water, and tested with tannin, iodine and picric acid, which did not affect the clear liquid; but Mayer's reagent gave a faint cloudiness. On precipitating the liquid with lead acetate and freeing the filtrate from lead, it was free from bitterness, yielded no reaction with the usual reagents for alkaloids, and no alkaloid could be obtained from it.

A tincture made with 15 per cent. alcohol gave results similar to the preceding. On treating the precipitate by lead acetate with ether, and evaporating the latter, a yellowish, apparently crystalline residue was obtained, which was soluble in alcohol and water and had the odor and taste of the drug.

A tincture made with strong alcohol was concentrated, mixed with water, which precipitated a light-colored resin, and the filtrate variously treated without yielding an alkaloid. It was noticed that ferric chloride caused a coloration similar to that produced by gallic acid; and that nitric acid in excess caused a blood red color both in aqueous and alcoholic solutions.

The bark collected by the author showed the same behavior as the commercial bark.

Daniel W. Cahill, Ph.G., collected a quantity of the root bark and stem bark, which were deprived of the corky layers and analyzed according to the plan of Dragendorff, with the following results:

	Root Bark.	Trunk Bark.
Organic matter extracted by petroleum benzin	·60	·20
" " " " strong ether	·36	·36
" " " " absolute alcohol	14·68	11·00
" " " " water	10·33	9·14
" " " " dilute alkali	·89	.83
" " " " dilute acid	4·20	2·16
Loss by bleaching	3·26	2·91
Moisture	6·76	7·23
Ash	5·92	5·40
Residue	45·95	56·09
Loss	7·05	4·68

The benzin extract consisted of wax, and in that of the root bark a little volatile oil was found. The resinous ether extract communicated to water a yellowish color and a bitter taste. More of the bitter principle was found in the alcoholic extract, the aqueous solution of which did not reduce Fehling's solution, yielded a white precipitate with tannin, reduced gold from the chloride, gave with phosphomolybdic acid a dark blue-green color and yellowish white precipitate, and was not disturbed by potassio-mercuric iodide, platinic chloride, or picric acid. The extract treated with potassa gave off ammonia. The aqueous solution rendered alkaline was shaken with chloroform, the latter evaporated, the residue dissolved in water, and this solution evaporated over sulphuric acid. The residue was crystalline, very bitter, and dissolved in hydrochloric acid without color, in nitric acid with a light yellow color, and slowly in sulphuric acid with a brownish red color, changing to dark purplish brown on heating. The resinous residue of the alcoholic extract still imparted to water a light yellowish color, changing to dark brown by alkali, and to yellowish again when acidulated.

The aqueous extract of the bark contained glucose and was free from tannin. The alcoholic extract of the bark represents the medicinal virtues.

An analysis of the trunk bark (it seems that the corky layer was not removed) was made at the University of Wisconsin, by Edw. Kremers. (Contributions from the Department of Pharmacy, Univ. Wis., 1886, p. 19–26.) The distillate with water showed traces of volatile oil. The distillate with potassa gave no reaction for a volatile alkaloid; the liquid in the flask attracted attention by its intense greenish-blue fluorescence. The infusion with acidulated water afforded precipitates with iodine and with potassio-mercuric iodide; likewise after precipitating with ammonia, filtering and acidulating, and also the ether residue from the alkaline liquid. Similar results were obtained after mixing the bark with lime and extracting with alcohol. Petroleum benzin extracted from the bark 0·52 per cent. of yellow fatty matter of the consistence of lard; and ether afterwards took up 2·08 per cent. of a soft resinous substance.

By a process similar to that of Salm-Horstmar for fraxin the precipitate with basic lead acetate yielded an amorphous glucoside readily soluble in water and alcohol, showing a strong blue fluorescence in alkaline, but not in acid solutions, and on boiling with dilute hydrochloric acid yielding sugar and an amorphous principle closely related

to fraxetin. The filtrate from the lead precipitate, freed from lead, contained sugar, and tannin precipitated from it a small amount of amorphous bitter principle. The bark exhausted with alcohol, was treated with hot water; this liquid contained gummy matter and mannite.

The tincture obtained with hot alcohol from 250 gm. of bark dried with milk of lime, was concentrated, acidulated with sulphuric acid, the liquid filtered, made alkaline with ammonia and shaken with ether. The ether residue on being taken up with acidulated water gave reactions with iodine and potassio-mercuric iodide; and on being evaporated spontaneously yielded crystals, which were freed from an amorphous dark colored mass, and were then almost insoluble in cold alcohol or water, but separated from the hot solution in slender needles, which are slightly acrid, neutral, melting at 166° C., soluble in ether and with a yellow color in ammonia, the latter solution becoming colorless with hydrochloric acid and gradually assuming a purplish tint. These crystals are probably *fraxetin.* Treatment of the alkaline solution with chloroform gave a dark purplish solution from which more of the crystals could be obtained, also solutions giving alkaloidal precipitates.

The precipitate with lead acetate from a tincture of the bark contained a soft substance of a somewhat resinous nature, which was partly soluble in hot water, the solution giving reactions with alkaloidal reagents.

All the above experiments render the existence of an alkaloid in white ash bark more than doubtful, without throwing much light upon the bitter principle. Mr. Kremers' results indicate a probable relation of at least one constituent to fraxin and fraxetin; but these principles as obtained from the barks of the European ash and of the horse chestnut are still very imperfectly known.

POLYGONUM HYDROPIPER.

By C. J. Rademaker, M. D.

That the active principle of this drug, which I first described in the American Journal of Pharmacy, November, 1871, is neither gallic nor tannic acid, as was stated by Messrs. H. Trimble and H. J. Schuchard, I think I have proven beyond a doubt (see this Journal, June, 1886, p. 279). In the July number, p. 356 of this Journal, I see that the gentlemen are considerably agitated over my criticism of their article, that they cannot resist the temptation of

calling attention to several statements, to which I shall respond with the greatest of pleasure.

Ad 1 and 2.—If I did not question that part of their paper referred to, the reason was that I overlooked it. But let me state here, that if my process or processes are minutely followed, no tannic acid can be separated in sufficient quantity to produce a precipitate with gelatin. (I do not mean to state that smart-weed contains no tannic acid.) If my article of 1871 is carefully read, it will be seen that this acid, after being separated from the organic matter and sulphide of lead by means of ether (when I speak of ether I mean absolute ether), and then simply allowed to evaporate without purification, of necessity must contain some impurity, but that impurity is not tannin. The only difference between the process of 1871 and the process of 1886, is purification of the acid. Any other differences in the processes depend upon definite chemical action, namely, the substituting of sulphuretted hydrogen for sulphuric acid in one case, and the substituting of bicarbonate of sodium for subacetate of lead in the other.

If the gentlemen will examine minutely that portion of their ether extract that was soluble in water, which they have entirely overlooked or forgotten (see Am. Jour. Phar., 1885, p. 21), they will find something of great interest to them.

Ad 3.—Messrs. Trimble and Schuchard state that "it is very poor chemistry to judge of the unknown constituents of a plant by its physiological action, or by the appearance of an ether residue under the microscope." Indeed, this is astonishing! What about the physiological action of strychnia, morphia, atropia and a host of others? Is not the action of these alkaloids such that you can be positive of their presence without any other chemical evidence? Let us suppose a hypothetical case of poisoning. The man swallowed something, we don't know what, but we find him in the following condition: A scarlet rash all over the body, great dilatation of the pupils, dryness of the fauces, constriction about the chest, difficulty of deglutition, etc. Any intelligent scientist would know that this man had either taken atropia, daturia or hyoscyamia; daturia could be excluded, because atropia and daturia are chemically and physiologically identical, and hyoscyamia can also be excluded, upon the ground that this alkaloid produces no scarlet rash upon the body. But to verify it, there is none of the substance left, for the man had swallowed all. A post mortem is made, the contents of the bladder and stomach, as well as

the blood, are examined, and from these contents the poison is extracted either by Otto's, Stas' or Dragendorff's methods.

After having separated it, the only chemical tests that we have are the reactions of the double iodides of bismuth and potassium and iodide of mercury and potassium. They produce precipitates in solutions of these alkaloids 'tis true, but they do the same with other alkaloids. And that the mydriatic alkaloids precipitate mercuric oxide from a solution of mercuric chloride does not help the case one particle, for all of the caustic alkaloids do the same. But such a minute portion, as 1 part in 130,000 parts of water, will produce dilatation of the pupil in the cat. Now, upon which would you rely, the physiological action, or upon the chemical reaction? For my part, I would have no hesitancy in saying that the man died from atropine poisoning. And, that it would be poor chemistry to judge of a crystalline residue, under the microscope, is simply absurd. If this is true, what would become of organic chemistry, urinology, histology, minute anatomy, physiology and pathology? If the gentlemen labor under that erroneous impression, I would advise them, in a most friendly manner, to read Lehmann, Frey, Virchow, and others. And after they have perused these works carefully, they will arrive at the conclusion that the microscope is the greatest aid to all scientific investigations that we possess.

Ad 4.—The very fact of the gentlemen not being able to isolate the acid, when they had a working process before them, is sufficient proof of "imperfect manipulation." If that will not suffice, I will refer them to the ether extract in their own analysis.

Ad 6.—The suggestion to "send 10 gms. of the so-called polygonic acid," &c., brings the whole matter down to a question of veracity, and, as I do not require any pharmaceutical society to verify any of my statements (as I am perfectly competent to do that myself), I shall have to most respectfully decline this part of the gentlemen's request. But I can, at any time, give evidence of gentlemen whose veracity is unimpeachable, and whose scientific rating is as good as any in the land.

Ad 7.—The evidence other than physiological action and microscopic crystals I will furnish with pleasure.

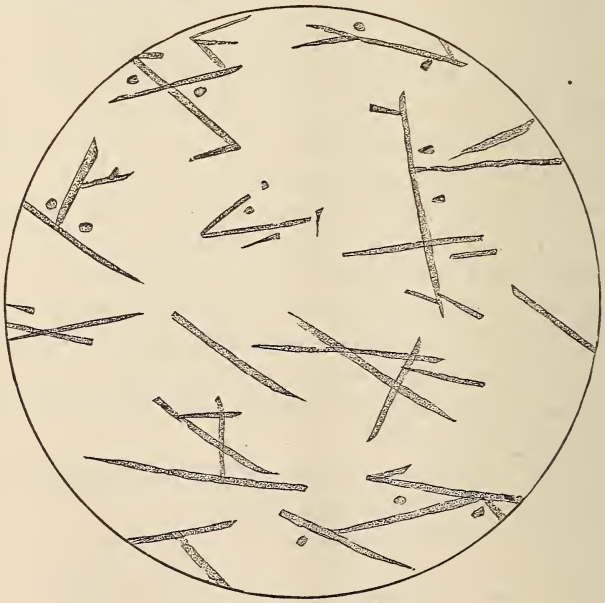
1st.—Polygonic acid is crystallizable.	1st.—Tannic acid is not.
2d.—Polygonic acid does not precipitate gelatin.	2d.—Tannic acid does.

3d.—Polygonic acid does not precipitate a neutral solution of a ferric salt.	3d.—Tannic acid does.
4th.—Polygonic acid does not precipitate a solution of tartar emetic.	4th.—Tannic acid does.

With the above reactions, I hope the gentlemen will be able to differentiate between tannic acid and polygonic acid.

1st.—Gallic acid produces a deep bluish-black color, with solutions of the salts of sesquioxide of iron.	1st.—Polygonic acid does not.
2d.—When a solution of gallic acid is added to a solution of proto-sulphate of iron, and to this solution a little acetate of sodium is added, a deep violet color will appear.	2d.—When polygonic acid is treated the same way, the violet color does not appear.
3d.—If a dilute solution of gallic acid is added to a dilute solution of caustic potash, an intense green color is produced.	3d.—If a dilute solution of caustic potash is treated with a dilute solution of polygonic acid, no green color is produced, but, to the contrary, an intense yellow color is produced.

Besides the above reactions, the difference in crystalline appearance will be noticed (for gallic acid, see figure below; for polygonic acid, see page 280 of June number).



GALLIC ACID x700.

In conclusion, I will state that the only point I aimed to make was, that the acid, which I isolated from smart-weed, was neither tannic nor gallic acid. This I have succeeded in doing satisfactorily to my mind; the doubts of Messrs. Trimble and Schuchard to the coutrary, notwithstanding; and with this I dismiss the subject.

Louisville, July 12, 1886.

Note by the Editor.—The explanations on the two analyses thus far made have been so ample, that further discussion will be of no avail for the present. The plant in question is so widely distributed, both in North America and Europe, that it will doubtless be investigated also by others.

ABSTRACTS FROM ITALIAN JOURNALS.

By Jos. W. England, Ph.G.

Glucose Test.—Fisher, Jaksch and Grocco observe, in the *Annali di Chim. Med.-Farm.*, Apr. 1885, p. 307, that a mixture of 1 part glucose, 2 parts phenylamine, 3 parts sodium acetate, forms fine yellow crystals of a substance termed *phenyl-glucose-amine,* according to the following reaction:

$$C_6H_{12}O_6+2\ NH_3C_6H_5=C_{18}H_{22}N_2O_4+2\ H_2O+H_2.$$

In a very dilute solution of glucose, in order to recognize the yellow crystals, it is necessary to use the microscope. Jaksch and Grocco have applied the test clinically. A process much practiced is the following: Mix, in a capsule, 1 part phenylamine, 1.5 parts sodium acetate and 20 parts of urine, heat for twenty minutes upon a salt bath. Cool and stand for a half hour and examine the precipitate under the microscope. If the urine contains glucose, groups of needle-shaped crystals will be obtained. This method, it is claimed, will distinguish as low as 0·1 gm. or less in 1 liter of urine.

Solubilities of Lithium Carbonate.—Bèvade (*Bull. Soc. Chim.*, xliii, p. 123, *Annali di Chim. Med.-Farm.*, 1885, p. 313) gives his experience, relative to the solubility of lithium carbonate in 100 parts of water, as follows:

0° C.	1·539 parts.
10° "	1·406 "
20° "	1·329 "
50° "	1·181 "
75° "	0·866 "
100° "	0·728 "

At 102° C., boiling for fifteen minutes, dissolves 0·796 parts, and boiling for thirty minutes, dissolves ·955 parts of the salt. According to the theory of the writer, since the solubility of the lithium compound diminishes with the increment of heat to 100° C., and then increases, he believes this increment to be due to the formation of a basic salt less soluble in cold than in hot water.

Ferro Pagliari.—Dr. L. Vinni, in *L'Orosi*, Sept. 1885, states that the "Ferro Pagliari" so largely used at present in Italy, is, physically, a limpid, transparent liquid, of clear, greenish color, inodorous, styptic, and acid in reaction and taste, even when largely diluted. The solution has a specific gravity of 1·050 (Skoda), and mixes with watery and dilute alcoholic liquids unchanged. If a dilute solution be treated with tannin or potassium ferridcyanide, the presence of a ferrous salt is quickly evinced, and on the addition of silver nitrate, a voluminous precipitate of chloride is formed. Preserved in enclosed vessels and exposed to the light, it remains unchanged. It has been recently introduced extensively by Pagliari, of Florence, already noted for the well-known haemostatic liquid which bears his name, Aqua Pagliari (solution of alum and benzoin, see Am. Jour. Phar, 1864, p. 375). He claims that it represents the very best form of iron administrable, and advises its use in doses of 10 drops or 14 to 20 drops a day, *i. e.*, half at breakfast and the other half at dinner, largely diluted with water.

This preparation, without question, is analogous to the "Liquor Ferri Chlorati (*s.* muriatici oxydulati)" of the former German Pharmacopœia (see National Dispensatory, third edition, p. 676), which is made by adding 520 parts of hydrochloric acid to 110 parts of iron-wire, allowing chemical reaction to ensue; heating, however, toward the end, to facilitate the emission of hydrogen. Then rapidly filter and to the filtrate, after the addition of 1 part hydrochloric acid, add sufficient distilled water to make the finished product weigh 1,000 parts.

Analysis of Male Fern.—G. Daccomo (*Annali di Chim. Med.-Farm.*, Jan. 1886, p. 19) has subjected to fresh chemical study, the rhizome of Aspidium Filix-mas, limiting himself, for the present, to the consideration of the chemical nature of the ethereal extract. Thirty kilograms of material were exhausted with ethylic ether, in a percolator, and after spontaneous evaporation, left 1,750 grams of ethereal

extractive. This extract, after treatment with a mixture of alcohol and ether, left as a remainder a brown pulverulent residue of 70 grams in weight. The insoluble residue so obtained was agitated with a solution of caustic potash (1-100), and from the filtered liquid, on the addition of acetic acid, gave a voluminous precipitate of filicic acid (filicin of Trommsdorff). The portion that was not dissolved by the potassa, and that remained upon the filter, was then exhausted with boiling alcohol, which deposited, on cooling, a white, flocculent material, wax-like in appearance, that after repeated crystallizations from alcohol, was used for the ultimate analysis.

The figures he obtained for his analyses led to the formula $(C_{13}H_{26}O)x$, and were as follows:

	I.	II.
C. per 100	78·99	78·80
H. "	12·98	13·28
O. (by difference)	8·03	7·92
	100·00	100·00

This substance is insoluble in water, very little soluble in ether or in cold alcohol. It is not saponified on prolonged ebullition with caustic potassa in concentrated alcoholic solution. The residue, left on the filter, after the boiling alcohol treatment, was merely extractive.

The more soluble portion of the ethereal extract, that is, that dissolved in the mixture of alcohol and ether, was, after reduction to extractive consistency, exhausted first with cold water. This aqueous solution, treated with acetate of lead to precipitate the tannin (filitannic acid?), washed and subjected to a current of hydrogen sulphide to remove excess of lead, left a saccharine residue.

The residue from the aqueous exhaustion was then treated with alcohol at 85° C., which, evaporated, left, as residue, a large quantity of a black extractive, soluble in caustic potash. The small residue left consisted of a wax-like fatty material soluble in alcohol, especially in the cold. From the alcoholic treatment, there did not remain as residue more than a small quantity of green fixed oil.

Mr. Daccomo is continuing his studies, toward the general nature of the volatile principles of male-fern, the results of which he will make the subject of another paper.

GLEANINGS FROM FOREIGN JOURNALS.

By George H. Ochse, Ph.G.

Purification of Naphthalin by means of Soap.—By repeatedly submitting commercial naphthalin to pressure in strong hydraulic presses and distilling, then treating with solution of soap at a temperature of about 85° C., which dissolves most of the naphthalin, and, on adding water and reducing the temperature to about 50° C., the naphthalin precipitates, the oily substances remain dissolved with the soap. By washing and redistilling, Link obtained almost chemically pure naphthalin in large snow-white flakes.—*Phar. Zeit. für Russland*, xxv, p. 279.

Salol.—Salol is a derivative of salicylic acid, an H atom being replaced by phenol. Salol is a white powder having a slight aromatic odor and, owing to its insolubility in water, it is tasteless. Salol is devoid of the disagreeable effects of salicylate of sodium. Prof. Neucky has studied the physiological effects of salol and states that it is merely resolved into its components without undergoing any further decomposition, as both phenol and salicylic acid are found in the urine. It is given in the same doses as salicylate of sodium, four gms. can be given daily without producing any visible effects. Although containing 38 per cent. of carbolic acid and coloring the urine almost black, no symptoms of intoxication are produced, evidently owing to the fact that it passes through the stomach unchanged. Prof. Neucky has demonstrated that the decomposition is due to the pancreatic juices in the duodenum. Dr. Saly finds salol to be an antipyretic and antiseptic. As an antiseptic, it is employed advantageously in putrid affections of the mucous membranes.—*Phar. Centralhalle*, xxvii, p. 219.

Bacteria in Sea-Air.—Moureau and Miquel have made microscopic analyses of sea-air at various places, and state, as the result of their observations, that when the breezes come from the sea the air is almost free from bacteria. When 100 kilometres out at sea the breezes coming from shore are also almost free from them, thus proving that the sea is an unsurmountable barrier to contagion. On vessels making long passages it was noticed that although the compartments were not entirely free from bacteria, they contained about 100 times less than in a Parisian home.—*Archiv der Pharmacie*, 1886, p. 368.

Characteristic Reaction for Citric Acid.—To distinguish citric acid from malic acid or tartaric acid, M. Mean fuses together 1 gram of citric acid and 70 centigrams of glycerin in a porcelain capsule by cautiously heating until the mass begins to bubble up and emit vapors of acrolein; on adding a small quantity of ammonia and about 2 drops of fuming nitric acid, or a 10-per-cent. solution of hydrogen peroxide a bright green coloration is produced, which gradually turns blue if the heat is continued. Neither malic acid nor tartaric acid show the same reaction.—*Journal de Pharm. et de Chimie*, 1886, xiii, p. 477.

CONTACT ACTIONS.

By D. Mendelejeff.

It is a generally received opinion that not only the molecules as a whole, but each of the constituent atoms are in motion, the movement of the latter being conditioned by the limits of the molecule. If the conception be reasonable, then in every state of aggregation there are presumably motions of two kinds, the one internal, the other superficial. The contact of two molecules, as also conditions of temperature, pressure, and electric potential, influence each kind of motion; thus the phenomenon of catalytic or contact action gradually passes into that of dissociation or of decomposition. Herein the decomposition of hydrogen peroxide is analogous to that of many detonating solids, in which a disturbance of atom-equilibrium at the superficies of the molecule causes its complete disruption.

Now supposing two substances, A and B, are in superficial contact with one another under such conditions that not only the superficial movement of the constituent parts, but also of the molecule as a whole, is disturbed; then three distinct cases are possible:

Firstly.—The atoms change their kind of motion without returning to their former state of equilibrium; no chemical change ensues, but merely a physical phenomenon, such as alteration of electric potential, condensation of gases, whether by a cold surface or by porous substances.

Secondly.—The internal movement of the molecule is altered, so that molecules of a different kind are formed by combination, replace-

ment, or decomposition. These changes are accompanied by an alteration of the energy of the system, but although the total heat effect observed is the algebraical sum of the energy changes, conditioned by the several changes of motion, yet thus far it is not possible to assign to each particular change its peculiar heat effect. As an example of chemical changes induced by the mere superficial contact of the molecule as a whole, the author quotes the well-known experiments of Spring on the combination of metals with sulphur by mere pressure.

Thirdly.—The motion of the atoms within the molecule taken by itself can be of such a kind as to produce a chemical change or formation of a molecule of a different kind, such as the so-called isomeric transformation. Or again, the superficial contact of B with A, a mixture of heterogeneous molecules may cause either a decomposition or a combination between them, as exemplified in the experiments of Hautefeuille and Lemoine, which demonstrate that the presence of porous substances can induce the combination of hydrogen with iodine, and conversely the decomposition of hydriodic acid, both reactions attaining a limit. Of a similar nature is the combination of hydrogen with oxygen, induced by contact with finely divided platinum, and also the recent experiments of Konovaloff on the decomposition of haloid derivatives of pentane by contact with materials in a state of fine division. These phenomena are generally classified under the title of catalytic or contact actions. Such can only be explained on the hypothesis that a stable substance B is in such a condition that a moderate perturbation of the constituent atoms at its superficies produce no disturbance in the atom-equilibrium of the molecule; whilst in the case of a changeable substance A, the equilibrium of atoms within the molecule is of such a kind that a comparatively unimportant change of motion at the superficies can cause the atoms to assume a different form, that is to say, can cause the production of a different kind of matter. If this be a correct representation of these contact phenomena, then the induced reactions should either be accompanied by a slight heat change, or, if accompanied by a considerable heat change, then the reaction should be capable of proceeding by itself in the direction of the heat evolution. An example of the former case is the reaction between hydrogen and iodine; of the latter is the system of hydrogen with oxygen in contact with platinum, which causes a lowering of

the reaction-temperature. In conclusion, it is remarked that it is desirable to find a method of research, not only to explain the connection of contact actions with other kinds of chemical change, but also even of the mechanism of the chemical change itself.—*Jour. Chem. Soc.*, May.—*Berichte D. Chem. Ges.*, 1886, pp. 456–463.

PARAQUINANISOÏL AND DERIVATIVES.

By Z. H. Skraup.

Paraquinanisoïl is best prepared by heating a mixture of 78 gms. anisidine, 50 gms. nitranisoïl, 320 gms. glycerol, and 125 gms. sulphuric acid for two hours; 50 gms. more of sulphuric acid are added, and the heating continued for two hours longer. The product is then diluted with water, distilled with steam, and the residue treated with potassium dichromate, which causes a precipitation of quinanisoïl chromate; this is then purified. Pure quinanisoïl forms a yellowish oil, which soon acquires a green, then a reddish-violet color; it boils with slight decomposition at 304–305° (uncorr.). Sp. gr. at 20° = 1·542 (water at 20° = 1). *Paraquinanisoïl hydrochloride*, $C_9NHOMe,HCl + 2H_2O$, forms colorless prisms, readily soluble in cold water and hot alcohol, insoluble in ether. It loses its water of crystallization over sulphuric acid. The *chromate* forms long, gold-colored, silky needles, which, when exposed to air, lose their lustre and become brownish; it is very sparingly soluble in cold water. The *neutral sulphate*, *acid sulphate*, *tartrate*, and other salts are described. The aqueous solutions of the salts all show a blue fluoresence. Chlorine-water and ammonia act on the salts, giving the green color characteristic of quinine compounds.

Paraquinanisoïl methiodide crystallizes from water in long, gold-colored, lustrous needles, which melt with evolution of gas at 235°. It is insoluble in ether, readily soluble in hot water and alcohol.

Thalline, $C_9H_{10}MeNO$, is prepared by reducing quinanisoïl with tin and hydrochloric acid; it forms thick, white prisms, sparingly soluble in water and light petroleum, very readily in alcohol, ether and benzene. It melts at 42–43°, and boils at 283° (uncorr.; bar. = 735 mm.). When treated with ferric chloride or other oxidizing agents, it acquires first a yellow, afterwards a dark emerald-green color.

Silver nitrate produces this coloration with separation of silver. *Thalline hydrochloride*, $C_{10}H_{13}NO,HCl$, crystallizes in well-formed prisms, sparingly soluble in alcohol. The *sulphate* (with 2 mols. H_2O) and other salts are described. *Acetylthalline*, $C_{10}H_{12}NO\cdot Ac$, forms clear, broad, monoclinic prisms, which melt at 46–47°. Its solubility resembles that of thalline. Bromine acts on thalline with formation of a compound, $C_{10}H_6Br_3NO$; it is a pale yellow powder, melting at 193–194°.

Methylthalline, $C_{10}H_{12}NOMe$, is prepared by the action of methyl iodide on thalline. It forms a thick, colorless oil, which, when kept becomes brown; it boils at 277–278·5° (uncorr.). When a solution in dilute hydrochloric acid is treated with ferric chloride it acquires a cherry-red color, which changes to reddish-yellow when kept long. The *hydrochloride* and *sulphate* crystallize in well-formed prisms, readily soluble in water.

Thalline hydriodide $(C_{10}H_{13}NO)_2HI$, and *quaternary dimethylthalline iodide*, $C_{10}H_{12}NOMe_2I$, are formed in the preparation of methylthalline. The former compound crystallizes in flat prisms, melting at 155–156°, insoluble in ethylbenzene, light petroleum, readily soluble in hot alcohol. The latter compound forms long prisms, insoluble in light petroleum, readily soluble in alcohol and in water, from which it crystallizes with 1 mol. H_2O. It melts with evolution of gas at 223–224°. Boiling aqueous potash, hydrochloric and nitric acids, do not act on it.

Ethylthalline, $C_{10}H_{12}EtNO$, is a thick oil which boils at 287–287·5°, with slight decomposition. It is insoluble in water, very readily soluble in alcohol, ether, and in mineral acids. Some salts were prepared; they are very hygroscopic and crystallize with difficulty. *Ethylthalline ethiodide* forms white needles, readily soluble in alcohol and in water, insoluble in ether; it melts, with evolution of gas, at 131–133°; when distilled it decomposes into ethyl iodide and ethylthalline.

Benzyl chloride acts on thalline with formation of a base, probably benzylthalline; when treated with ferric chloride, it gives the same characteristic red color as methyl- and ethyl-thalline.

The physiological properties of several of the compounds mentioned in the paper are described. The paper concludes with remarks on the constitution of quinine.—*Jour. Chem. Soc.*, 1886, p. 79.—*Monatsh. Chem.*, vi, 760–784.

HYDROQUINONE AND ARBUTIN.

By Hugo Laurentz, M. D.

Abstract of an Inaugural Dissertation, University of Dorpat, 1886, communicated by the author.

The primary object of the author's investigations was the detection of the two substances named, in the animal tissues and excretions, and a number of experiments were therefore made with the view of finding characteristic tests. The color reactions of *hydroquinone*, obtained after evaporating the alcoholic solution, are as follows: Frœhde's reagent, violet color, becoming darker and gradually green from the margin. Bromine vapors to the moist residue gray, under the microscope showing stellate or fascicular needles of a blackish color with green hue, and becoming intensely green with ammonia, quickly changing to brown. Chlorine vapors or chlorine water, like the preceding, but the green color with ammonia less bright. The same behavior was also shown with dilute solutions of bromine in potassium bromide, and of iodine in potassium iodide. Chlorinated lime solution forms at once dark green crystals of green hydroquinone, becoming brown and dissolving in excess of reagent colorless. Silver nitrate warmed, black precipitate and characteristic pungent odor of quinone somewhat resembling that of iodine. Ferric chloride, at first green hydroquinone, and with more of the reagent quinone. All these reactions are observed with 0·02 mgm. of hydroquinone, and several other less characteristic or less delicate reactions are described by the author.

Hydroquinone was next mixed with urine, blood and other organic matters, from which after acidulation with sulphuric acid it was not dissolved by petroleum benzin, but was taken up by benzol, chloroform, ether and acetic ether, the residues left by the evaporation of the latter yielding the color reactions most distinct. The urine passed within twelve hours, after having taken 0·1 gm. hydroquinone, yielded enough residue to give slight reactions with Frœhde's reagent. On increasing the dose to 0·15 gm. reactions were also obtained with ferric chloride (odor of quinone) and with silver nitrate; but chlorine water and ammonia gave yellow or brown color. The urine was now boiled with 1 per cent. sulphuric acid, agitated with acetic ether, the residue of evaporation boiled with sulphurous acid, again shaken with acetic ether and

evaporated; the residue gave no crystals with chlorine water, but a distinct green color on the further addition of ammonia. Rabbits took from 0·05 to 0·1 gm. hydroquinone without bad effect; cats were killed in one hour by 0·2 gm., and in 8 hours by 0·1 gm. of hydroquinone, after tonic and clonic convulsions. The presence of the compound was determined in the blood, urine and different organs, including the brain, but not in the muscles or in the feces. The excretion of the hydroquinone from the human body seems to be completed in about 15 hours. Frœhde's reagent was found to be the most delicate test, though not conclusive in all cases.

Similar experiments, made with *arbutin*, showed that this is excreted with the urine in about 15 hours, but is not found in the feces. Cats, after taking 1.0 gm. of arbutin died in 10 hours after almost constant convulsions; rabbits took the same dose without ill effects. The blood and most of the organs of animals poisoned with arbutin, showed its presence more or less distinctly. It may be isolated by mixing the liquids with sulphurous acid and agitating with acetic ether; chloroform and ether give less reliable results, and petroleum benzin does not dissolve arbutin. On boiling the liquids with 4 per cent. sulphuric acid, hydroquinone is produced.

The reactions of arbutin are as follows: Frœhde's reagent colors 0.02 mgm. arbutin violet, becoming darker and green from the margin (like hydroquinone). Concentrated sulphuric acid and dilute solution of ferric chloride, of each 1 drop, strongly heated, color 0.02 mgm. arbutin dark chestnut-brown (hydroquinone is colored olive-green). Silver nitrate with 1 mgm. arbutin, black precipitate, no odor. Ferric chloride, diluted and warmed, steel-blue color with 1 mgm. arbutin. Bromine vapors, followed by ammonia, gradually green color, changing to brown. Chlorine water dissolves colorless, changing with ammonia, in the presence of more than 0.1 mgm. arbutin, to green, finally brownish (quinine, which gives a similar reaction, is not taken up by ether from the acid liquid). Heated with chlorine water, followed by a little ammonia or potassium ferricyanide, more than 0.02 mgm. arbutin gives a brown to brownish-violet color. More than 0.1 mgm. arbutin triturated with sugar and moistened with sulphuric acid, gradually turns reddish, then blue, and, finally, green.

J. M. M.

ON THE OCCURENCE OF PEPSIN AND TRYPSIN IN NORMAL HUMAN URINE.

By Dr. Sahli.

The investigation of the amount of pepsin in urine is based on the facts given by v. Wittich that blood fibrin, both in neutral and acid solutions, absorbs pepsin with great eagerness, and that the amount which a flake of fibrin absorbs depends on the amount of fibrin present in the fluid.

To compare the amount present in two perfectly fresh urines, equal quantities of well-washed fibrin are introduced into them, and left in them for equal periods. The urine is poured off, and the flakes washed with distilled water, after which they are placed in equal quantities of ·1 solution of hydrochloric acid.

Since now, according to Brücke, within certain limits the speed of digestion is dependent on the amount of ferment, conversely we may form an estimate of the amount of ferment present from the time required to effect the disappearance of the fibrin.

In this way Sahli found that human urine invariably contains pepsin, and that the amount present undergoes very great variations in the course of 24 hours. The morning urine contains the greatest amount, then the urine before dinner, then that directly before supper. The first minimum occurs two hours after breakfast; the second, more marked, one and a half to two and a half hours after the midday maximum. A comparison of the curve exhibiting these variations with that which shows the secretion of the fundus of the stomach, leads to the conclusion that the pepsin in the urine is derived, not from the pepsinogenic substance of the gastric glands, but that it is the completed secretion of the stomach, resorbed along the digestive tract, and carried by the blood current to the kidneys, by which it is partially eliminated.

Urine also contains trypsin, which, however, cannot be isolated by fibrin. Still, Sahli convinced himself that the amount of this ferment also varies, being regularly diminished after dinner, and greatest after breakfast. — *Med. Chronicle*, June; *Pflüger's Archiv*, xxxvi. p. 209.

PREPARATION OF KEFIR AND OF KOUMIS.

By Dr. Rogelmann, of Graz.

Milk-wine, or kefir, may be made by the following method: One volume of buttermilk is to be mixed with one to two volumes of sweet milk, poured in a bottle, and allowed to stand. In three hours active fermentation will set in, which in about three days will be at an end. The product is a fluid smelling like wine, and containing alcohol, carbonic acid, lactic acid, and casein. The following precautions are to be observed in this in every way simple and inexpensive procedure. The sweet milk used ought not to be wholly freed from the cream, and the bottles ought to be of a size that the milk fills only two-thirds of them. The fermenting milk is to be shaken daily vigorously (about two or three times), during which manipulation a cork is to be placed firmly in the bottle, but removed after the shaking, in order to allow the carbonic acid to escape. The opened bottle is to be placed in a horizontal position, at least twice daily, for a period of ten minutes, in order to let fresh air take the place of carbonic acid, and to thus prevent the stoppage of fermentation. If a very effervescent liquid be desired, the bottles are toward the close of the fermentation process allowed to stand continuously in a perpendicular position. In order to obtain new quantities of this "milk-wine," we add to a certain quantity of sweet milk one-fifth its volume of milk thus fermented, and are so able to continue this production *ad libitum*. The most favorable temperature for the preparation of this milk-wine is 15° (C).

Koumis may be made in the following way:—A pint of buttermilk or a bottle of koumis is added to a gallon of new milk in a basin. This is stirred steadily round in one direction for a quarter-of-an-hour, and covered up for twelve hours, when it is again stirred in the same direction for another quarter-of-an-hour. It then stands for twelve hours more, covered up from dust, when it is put in champagne bottles, and the corks tied down. After a few days it can be used, being well shaken before opening, and care being exercised in opening the bottles.—*Med. Chronicle*, June.—*D. Mediz. Ztg.*, Jan. 14, 1886.

Caffeine in infection of 0·1 gm. was successfully used by Dr. A. Langgard in a case of poisoning by curare. He further recommends caffeine in poisoning by conine.—*D. med. Woch.*, No. 12, 1886.

ON COMMERCIAL SULPHATE OF QUININE.

The purity of commercial sulphate of quinine has been the subject of a number of communications to European journals. One of these papers has been republished on p. 243 of the present volume of this Journal. Dr. O. Hesse (*Phar. Jour. and Trans.*, March 27, 1886) shows that the commercial salt containing a moderate amount of cinchonidine sulphate, can be deprived of this impurity by two re-crystallizations from boiling water. On further re-crystallization, no alteration should take place in the rotatory power, which for absolutely pure quinine sulphate, was ascertained to be $[a]_D = -233.75°$. It is also shown that from moderately concentrated solutions the quinine sulphate crystallizes together with the cinchonidine sulphate in massive brilliant needles, which may be regarded as an actual double salt. Cinchonidine hydrochlorate crystallizes from concentrated solutions in needles with 2 H_2O, and from dilute solutions in octohedrons with 1 H_2O; but when mixed with a preponderating amount of quinine hydrochlorate (which crystallizes only in needles with 2 H_2O), the two salts crystallize in needles with 2 H_2O, not separately, but in all proportions together.

Dr. J. E. De Vrij (*The Chemist and Druggist*, May 1, 1886) observed in 1883 that quinine sulphate tested in Hesse's quinometer (see Am. Jour. Phar., 1879, p. 136) would invariably yield crystals of cinchonidine if the ethereal liquid was kept for 12 or 14 days; and he recommended (*Nieuw Tijdschr.*, 1884, p. 10) as the best practical means for obtaining pure quinine sulphate, that it be prepared from the acid sulphate, which never contains cinchonidine. Dr. De Vrij's assertion that no commercial quinine sulphate containing less than 5 per cent. of cinchonidine sulphate was to be met with, was based upon a number of assays, one of which, made since, is described, and consists in converting the salt into the acid sulphate, precipitating the mother liquid with soda, converting these alkaloids into tartrate, and submitting to the optical test (Oudemans, 1875, 1877). This method showed the sample to contain 7.41 per cent. cinchonidine sulphate, and is stated to afford approximate results only, while accurate results (9.46 cinchonidine sulphate in the same sample) are stated to be obtained by mixing a hot solution of quinine sulphate with a hot solution of an equal weight of sodium tartrate, drying the precipitated tartrate below 30° C., and dissolving 1 gm. of this salt in 7.5 ccm. of normal

hydrochloric acid and sufficient water to measure 50 ccm. at 17° C.; this solution is tested in Laurent's polariscope in a tube 0.5 m. in length. Two commercial samples of English manufacture were thus found to contain 5.723 and 10.850 of water, and 9.508 and 6.942 of cinchonidine sulphate; two of French manufacture, 14.646 and 13.762 water, and 9.072 and 12.448 cinchonidine salt; five of German manufacture, between 12.426 and 17.842 water, and between 4.730 and 8.180 cinchonidine salt, and one of Dutch manufacture, 13.714 water and 8.355 cinchonidine salt, while a sample made at Amsterdam from the acid sulphate contained 12.425 water of crystallization and was free from cinchonidine.

Dr. O. Hesse (*Phar. Jour. and Trans.*, June 5, 1886) states that the rotatory power of quinine sulphate on being heated to 120° C. is not augmented, but undergoes a minute reduction, as he showed in 1876 (*Liebig's Annalen*, vol. 182, p. 154), and criticises the different results obtained by Dr. De Vrij with the same sample of quinine salt by means of the optical method By this method, however, cinchonidine can be most accurately determined in the presence of quinine in the absence of hydroquinine, which is usually present in commercial quinine sulphate. In 1882, Dr. Hesse published a note on hydroquinine (see Am. Jour. Phar., 1882, p. 363), and a more extended memoir will shortly be published. This alkaloid which is associated with quinine in cinchona bark, is a saturated compound while quinine is not. Its neutral sulphate crystallizes with 8 H_2O, sometimes with 6 H_2O; the anhydrous salt requires at 15° C. 348 parts of water for solution, and although 5 ccm. of this liquid require 25 ccm. of ammonia, sp. gr. ·960, for the complete solution of the alkaloid, it cannot be detected in quinine sulphate by the pharmacopœial test. The two sulphates form a compound crystallizing in long delicate needles, and hydroquinine cannot be separated completely except by converting quinine sulphate into the acid salt, and recrystallizing this from water or alcohol, when hydroquinine remains in the mother liquors. Its tartrate is almost as sparingly soluble as quinine tartrate.

As a therapeutic agent hydroquinine is of the same kind as quinine sulphate. But when the optical method of testing is applied to such a salt, the hydroquinine sulphate present in it produces an effect similating that of cinchonidine sulphate in the proportion of 1 : 0·42, and it is in this way that the optical method of testing leads to a result that is incorrectly unfavorable so far as relates to the amount of

cinchonidine thus apparently indicated. In some instances the optical method has given data indicating the presence of some 2 per cent. of cinchonidine sulphate in material that did not contain a trace of it.

The rotatory power of the alkaloids in question under the conditions laid down by Oudemans,[1] were determined by Dr. Hesse to be as follows:

For concentration A:	Quinine tartrate	$(a)_D =$	—216·6°
	Cinchonidine tartrate	"	—134·6°
For concentration B:	Quinine tartrate	"	—212·5°
	Hydroquinine tartrate	"	—176·9°
	Cinchonidine tartrate	"	—132·0°

J. M. M.

THE KOLA NUT AND ITS ACTION.

By Watson Smith, F.C.S., F.I.C., Lecturer on Chemical Technology, Victoria University.

The kola nut (Cola acuminata) is indigenous to the West African coast. Heckel and Schlagdenhauffen say the seeds are reputed to clarify and render healthy the most foul waters, and even to make tainted meat edible. A member of the Linnean Society gave, at a meeting of that society, an account from actual experience of the kola, and of certain effects produced by it. He stated that the foreman of his estate was habituated to excess in drinking, and that every Saturday his habit got considerably the better of him. However, he had a wife who cared for him (and herself), and she reduced a kola nut to the condition of a paste every Monday morning shortly before her husband's services were required, and administered the paste to the man. In thirty minutes his head was clear again. But it is further maintained that after such an application of the kola a drunkard cannot return to alcoholic stimulants for some days without feeling nausea. At some of the garrison towns a native sits at the road side, and sells the nuts as the soldiers pass. By the time the men reach the barracks they are quite clear-headed, and the stupefaction

[1] The solutions with which Oudemans operated, and his results, are as follows:

	Concentration A.	Concentration B.	Concentration C.
Tartrate	0·4	0·8	1·2 gm.
Normal hydrochloric acid	3·0	6·0	9·0 ccm.
Distilled water sufficient for	20·0	20·0	20·0 ccm.
Quinine tartrate $(a)_D =$	—215·8°	—211·5°	—207·8°
Cinchonidine tartrate $(a)_D =$	—131·3°	—129·6°	—128·1°

Editor Am. Jour. Phar.

caused by drinking spirits is gone. On the west coast of Africa, the Mahometans and Arabs surpass the natives in point of drinking capacity, for whilst drinking they also chew kola, and so anticipate the after ill-effects otherwise experienced, and prevent them. A little supply of kola nut, I would suggest, or its paste, might prove a useful help to the professional heads of our hydropathic establishments, serving for use as a kind of anti-periodic against those attacks of alcoholic craving, sometimes leading inmates to wander forth and commit themselves to positively dangerous excesses. The kola nut contains very considerable quantities of caffeine (over two per cent.), and also some theobromine, and it forms the basis of a stimulating food (the paste) of great value.

Dr. A. Hudson, Medical Inspector of the United States Navy, has recently stated in a letter to Dr. Thomas Christy, of London, to whom he has applied for an experimental supply of the kola paste, that being put in possession, by the Surgeon-General of the U. S. Navy, of a sample of the paste, he had employed it in a case of mitral disease, with granular kidney of slow progress, the average quantity of urea contained in the urine being about half the normal. With much lassitude and malaise there were intense headaches (probably uræmic) at intervals of three or four weeks, and some dyspeptic symptoms. The kola was given economically for nearly a month, with apparently decided benefit. Certainly the tone and vigor of the patient improved, and the single headache which occurred within six weeks had less than a day's duration, and was of a mild character. Synchronously there was an increase in the amount of urea excreted, as well as the quantity of urine.—*Med. Chronicle*, June, 1886.

CONSTITUENTS OF LOBELIA.

By Hermann von Rosen, M. D.

Abstract of an Inaugural Dissertation, University of Dorpat, 1886, communicated by the Author.

Lobelia nicotianæfolia is indigenous to southern and western India; the infusion of the leaves is used as an antispasmodic. The lower part of the stem is woody, about $1\frac{1}{2}$ inches in diameter; the upper part is hollow and tubular. The leaves resemble tobacco leaves in shape, are finely toothed and hairy. The capsules are of the size of a pea, two-celled, and contain numerous light brown seeds which are

about $\frac{1}{50}$ inch long, oval, flattened, and finely striate. The dried plant is covered with numerous resinous dots, and has an acrid, biting taste. Dr. H. v. Rosen obtained from the powdered herb

Moisture	12·77
Ash (of which in water soluble 2·04 per cent.)	9·35
Sand	0·47
Albuminoids and alkaloids soluble in water	2·49
Albuminoids soluble in soda solution	8·23
Insoluble albuminoids	9·09
Cellulose	28·58
Fat and other substances soluble in petroleum benzin	3·68
Resin and chlorophyll soluble in ether	2·01
Mucilage soluble in water	2·50
Metarabic acid (pectin)	0·27
Lobelic (?) and other vegetable acids	6·21
Amylaceous substances	1·29
Other substances soluble in water	1·60
Other insoluble bodies (cuticular substances, lignin, etc.)	11·46
	100·00

The presence of alkaloids was ascertained from the acid infusion which was successively agitated with petroleum benzin, benzol and chloroform, then rendered alkaline with ammonia and agitated as before. The benzin solution from the alkaline liquid contained the liquid alkaloid *lobeline*, and the chloroform solution when evaporated left striated prisms of another alkaloid; minute quantities of the latter were also found in the benzol solutions from both the alkaline and acid liquid, and a somewhat larger quantity in the chloroform solution from the acid liquid. The benzin solution of lobeline gives with ether and hydrochloric acid a whitish precipitate of *lobeline hydrochlorate*, and this salt yields with Frœhde's reagent the characteristic red color passing into violet, and gives precipitates with picric acid; auric chloride and with bromine in potassium bromide. The second alkaloid yields heavy precipitates with the usual reagents, except picric acid and tannin which cause in the solutions a slight turbidity; Frœhde's reagent gives a brown color changing to green, and sulphovanadic acid causes a cherry-red or violet-red coloration.

The same two alkaloids were also obtained from Lobelia inflata, *Lin.*, though the volatile lobeline was present only in minute quantity, the herb having been on hand for a prolonged time.

The physiological experiments, made with lobeline sulphate prepared by Merck, and with the two alkaloids obtained from the above-

named two species of lobelia, gave almost identical results and agreed with those obtained by Dr. J. Ott with Procter's lobeline (see Am. Jour. Phar., 1875, p. 127), though the author differs in some respects from Dr. Ott in the explanation of the effects observed. J. M. M.

EXAMINATION OF THE SO-CALLED SPRUCE-GUM.

By Adolph F. Menges.

The so-called spruce-gum of commerce is the balsamic exudation of *Abies nigra*, Poiret, the black or double spruce, which, according to Gray, occurs in swamps and cold mountain woods from New England to Wisconsin and northward, and southward along the mountains. The source of this commercial article was traced by Professor E. L. Patch a few years since,[1] and was then definitely referred to the above tree, although also stated that a much smaller quantity is produced by *Abies alba*, Michx., the so-called white spruce, but none from *Abies canadensis*, Michx., or the hemlock spruce, which affords the officinal Canada pitch or hemlock pitch.

In order to be assured of the true botanical origin of the substance used in my investigation, some twigs and cones of the tree affording the so-called gum were obtained from Vermont and submitted to Professor William Trelease, by whom they were readily identified as the above-mentioned *Abies nigra*.

The method of collecting spruce-gum has already been quite accurately described,[2] but the following information relating thereto would seem to possess some interest, and for which I am indebted to Mr. J. G. Rich, of Bethel, Maine, who has been engaged in the collection of this substance for a number of years. Mr. Rich writes substantially as follows: Spruce-gum is not obtained by puncturing the trees,—at least, not to any great extent; the causes for the flow of sap being natural ones, such as a rotten knot or a seam up and down the tree caused by extreme heat or cold. Therefore, the gum does not occur on any particular part of the tree, but is found from the bottom to the top on such as are injured or decayed. Simply bruising the tree will not cause a flow of sap—the cavity must extend through the bark and sap-wood. This causes a good flow, which is at first transparent

[1] New Remedies, January, 1882, p. 23.

[2] American Druggist, October, 1885; also, Pharm. Journal (London), 1885, p. 370.

and viscid, but upon exposure becomes opaque and hardened, gradually assuming various shapes, and becoming of a darker color from year to year. It has been found that those trees situated on low or level lands yield little or no gum. The trees yielding the largest amount are located on the mountains, more especially the tops and sunny sides, and those woods which have been thinned out by logging or otherwise. The gum is collected in winter time by men on snow-shoes, when there are several feet of snow on the ground, as they are thus capable of traveling much faster. They are provided with a little contrivance made by taking a small tin cup, to which is fastened a chisel in such a way that the gum may be cut off and allowed to fall into the cup; the latter is so arranged with a holder that a long pole may be inserted, thus enabling them to reach the pieces on the upper parts of the tree. They collect as much as can conveniently be carried, taking it to their houses, where it is cleaned by the women and children. Each piece has to be scraped separately, after which operation it is sorted and brought into the market.

The gum[1] at my disposal was obtained from a dealer in Vermont, who states that it is collected in Maine, New Hampshire, Vermont and Canada, the largest amount and that of the best quality coming from the latter point. It occurs in irregular pieces of various shapes and sizes, is of a reddish-brown color, brittle, and breaks with a rough fracture; it has a faint odor, and, when chewed, a terebinthinous and slightly bitter taste. It is readily soluble in alcohol, and the solution has an acid reaction. Among the fragments of gum, pieces were observed which gave two distinct color reactions with strong sulphuric acid, the one giving a pinkish-purple, the other a deep green coloration. Selected pieces of the gum when freshly broken exhibit a white surface, which, upon exposure to the air, soon acquires a pink hue, thus reminding of the similar change observable in asafœtida.

Portions of the gum were submitted to distillation with and without water. By the latter method a larger amount of volatile oil was obtained, although, owing to the frothing of the heated mass, the entire amount of volatile oil present could not be separated, but the percentage appeared to be relatively small.

The volatile oil was dried by contact with calcium chloride, and then re-distilled. It forms a limpid, colorless liquid, having a char-

[1] The word *gum* is used here in its popular sense, although obviously incorrect from a scientific standpoint.—F. B. P.

acteristic, terebinthinous and rather agreeable odor, and the specific gravity 0.85. Its boiling point is 160° C. (the mercury being entirely in the vapor). With iodine it fulminates, and in contact with a mixture of nitric and sulphuric acids it takes fire, thus evidently consisting simply of a terpene $C_{10}H_{16}$, as was also indicated by its boiling point. With hydrochloric acid it did not form, however, a crystalline compound, nor could crystals of terpin be obtained therefrom by the usual process. The amount of oil obtained did not suffice for an examination of its optical properties.[1]

The aqueous distillate from the gum, from which the volatile oil had been separated, had an acid reaction and a somewhat acetous odor, but gave no reaction with ferric chloride. It was digested with barium carbonate, and the solution filtered and evaporated, when a white, scale-like residue was obtained. The salt was quite freely soluble in water, and afforded white precipitates with silver nitrate and with basic lead acetate. When mixed with sulphuric acid it gave off the odor of butyric acid, and when this mixture was heated with a little alcohol it developed the very characteristic odor of butyric ether. An estimation of the barium was made, but the salt had absorbed a little carbonic acid, and the percentage of barium found was, therefore, a little less than that of barium butyrate, with which it otherwise appeared to agree.

A portion of the resin was completely exhausted with hot water to ascertain the presence of a bitter principle. The solution so obtained had an acid reaction, and when evaporated to dryness left an amorphous, blackish-brown residue, having a bitter, somewhat acrid and astringent taste. When dissolved in water it afforded a turbid greenish solution, which became clear when heated, but gave no precipitate with tannin.

[1] It is believed that this is the first examination which has been made of the volatile oil obtained from the so-called spruce-gum, and the references to this subject in our literature are very limited. Mr. F. Stearns (Amer. Journ. Pharm., January, 1859, p. 29) states that "the commercial oils of spruce and hemlock are one and the same thing, and are distilled from the boughs of *Abies canadensis*." The only other notice relating to oil of spruce that I have been able to find occurs as an abstract in Amer. Journ. Phar., April, 1844, which has been kindly afforded me by Professor J. M. Maisch. The latter investigation was made by Gottschalk, under Wöhler's supervision, and refers to the oil obtained from the young twigs of *Pinus Abies*, Lin., or the Norway spruce fir. That oil was found to consist of a terpene, boiling at 160° C., and afforded likewise no solid compound with hydrochloric acid.—F. B. Power.

The resin remaining after the distillation of the volatile oil from the so-called gum formed a transparent, amorphous and brittle mass, which was soluble in alcohol, methyl alcohol, ether and chloroform, sparingly in benzol, and insoluble in petroleum ether. When the finely-powdered resin was brought into a boiling solution of potassium or sodium hydrate it readily dissolved, forming a soap-like compound, which separated on cooling, but which was of a much darker color than the corresponding soap prepared from common rosin or colophony. With potassium or sodium carbonates it seemed incapable of dissolving or forming such soap-like compounds.

Several experiments were made with the view of separating a crystallizable acid or other crystallizable principle from the spruce resin, but without success, as may be shown by the following results:

1. A portion of resin of spruce was digested with alcohol of the specific gravity 0.89, in which it was found to be completely soluble, whereas colophony digested with alcohol of this strength readily affords crystals of abietic acid; with alcohol of specific gravity 0.92 a similar result was obtained.

2. The resin was boiled with a solution of caustic soda for the purpose of combining the acid, and the clear solution subsequently precipitated by hydrochloric acid; but the precipitate was entirely devoid of crystalline structure and had simply a resinous appearance.

3. Ten grams of resin were dissolved in alcohol, and the solution precipitated by an alcoholic solution of lead acetate. The resulting precipitate was collected on a filter, washed with alcohol, and afterward suspended in alcohol and decomposed by hydrogen sulphide. The filtrate from the lead sulphide was allowed to evaporate spontaneously, when a reddish-brown, amorphous residue was obtained, corresponding to 14 per cent. of the original resin. It was readily soluble in alcohol, ether and chloroform, but did not crystallize from these solutions. It fused completely at about 100° C.

The filtrate from the lead acetate precipitate was then treated also with hydrogen sulphide in order to remove the excess of lead salt, and filtered. The latter filtrate, upon evaporation, afforded a non-crystallizable residue of a bright reddish-brown color, corresponding to 86 per cent. of the original resin. Its fusing point was about the same as that of the preceding portion. Both of these constituents of the resin, when moistened with a drop of concentrated sulphuric acid, produce a bright purple color, somewhat similar to the strychnine

reaction with sulphuric acid and potassium bichromate, but differing essentially from this by the color being permanent.

By the oxidation of colophony with dilute nitric acid Schröder obtained isophtalic, trimellithic and terebinic acids. By the oxidation of 50 gms. of spruce resin with nitric acid I obtained only picric acid. From the latter the potassium and sodium salts were prepared and obtained in handsome crystals, which explode like gunpowder when heated on platinum-foil.

From the results of this investigation it will be seen that the so-called spruce-gum differs in many respects from the other balsamic exudations of the Coniferæ, which have as yet been chemically examined.—*Contrib. Dep. Phar., Univ. Wisc.*, 1886, pp. 30–34.

INSECTS AND FLOWERS: A QUESTION.[1]

By C. E. Meetkeerke.

Nearly four years ago a paper was published in *Chamber's Journal*,[2] purporting to give a short summary of the discoveries which had been made up to that time by a great many careful inquirers on the subject of insect agency in the fertilization of flowers. Since then the Knight-Darwin theory, as it is called in Germany, has progressed with such a rush in one direction that a reaction is already setting in, and it is now almost beginning to be doubted, not only if cross-fertilization is necessary to the life of plants, but even if it is particularly advantageous to them.

When Sprengel, Knight, Delpino, Müller, and a host of other writers, asserted that the aid of insects was necessary for the complete fertility of plants, and when Charles Darwin undertook his own practical researches on the subject, little doubt was left upon the minds of unprejudiced people as to the intimate relations existing between the animal and vegetable kingdoms. Darwin was supposed to have freed himself from what were held to be the mistakes of Sprengel and the early investigators, but even he had ventured to affirm the general truth of their conclusions before he had himself engaged in any very critical researches. Some contradictions arose, and it was remarked that the records of botanical literature are

[1] From the *Medical Bulletin*, May.

[2] *Chambers' Journal*, June, 1882.

vitiated by a larger intermixture of falsity and fiction than might be imagined possible in an experimental science.

Sprengel's work was published in 1793, and in 1862 Darwin wrote his "Fertilization of Orchids," which was enthusiastically received, but which gave rise to the well-founded objection that in most orchids the operation of insect visitors was only indirectly concluded from the structure of the flowers.

"Criticisms near the mark or further from the mark, or even altogether far and away from any mark," only led to the conviction that there is much more in the shape of a petal and the position of a plant-hair than was formerly supposed, and that insects do not merely loiter about brilliant blossoms in idle satisfaction or for necessary sustenance, but that they have a mission to increase the beauty and prolong the life of flowers, and it is added that, so well is this mission understood, that flowers, in their turn, learn to distinguish between profitable and unprofitable visitors, and grow to provide special arrangements for allurement or exclusion. This being stated, we must either allow subtle, secret meanings to color, shape, and all the beautiful, familiar things taken once upon a time for granted, as a part of natural development, to be one of the forces in the great heaving life sea, or else reject the whole theory as extravagant and mistaken. Going still further, we are told that it is to insects we owe the beauty of our gardens, the sweetness of our fields, and that to them alone flowers are indebted for their very existence, and when we come to this, the most casual inquirer is led to find out what grounds exist for it, how far it is borne out by evidence, and if we are really bound to accept as truth that, should butterflies, flies, and bees be exterminated, the world would no longer know the beauty of flowers.

Fairly to examine the true Knight-Darwin theory, it will be well to learn from their own words to what conclusions these able men arrived as the result of their researches. We shall then be in a position to remark that the rolling stone of a new doctrine, once set in motion, is never in want of a friendly shove. We see how hasty conclusions are made to harmonize with preconceived ideas and extravagant notions are issued as true coin.

The favorite text of Darwin's interpreters is his much misapprehended maxim, "Nature abhors perpetual self-fertilization;" and, as if foreseeing that such an axiom might lead to mistakes, he defines

his meaning with precision in some introductory remarks to his work on "Cross and Self-Fertilization." These are his words: "In 1862, I summed up my observations on orchids by saying that nature abhors perpetual self-fertilization; if the word perpetual had been omitted, the aphorism would have been false." And in another place: "From my own observations on plants I became convinced, many years ago, that it is a general law of nature that flowers are adapted to be crossed, at least occasionally, by pollen from a distinct plant." This opinion was ratified by Andrew Knight in these words: "In no plant does self-fertilization occur for an unlimited number of generations."

It will be remarked how wide a difference exists between the guarded expressions of these careful inquirers and the rash law-giving of later writers, who, although working on the lines laid down by Darwin, have assuredly studied only the contrivances which are favorable to cross-fertilization, and neglect to make mention of those facts, so weighty and so numerous, which tell so dead against them. They appear to forget that there are many plants whose pollen is wafted away by the wind, and which are wholly independent of insects. That there are great numbers which are propagated by grafts, buds, layers, bulbs, tubers, and cuttings, besides over thirty natural orders of cleistogamic plants, closed to all comers, necessarily self-fertilized.

In 1869 Severin Axell divested some hasty conceptions of their one-sidedness, and, besides the facts just mentioned, he drew out a list of plants in which self-fertilization inevitably takes place, mentioning those also which are aquatic, and which, under ordinary circumstances, expand their flowers at the surface of the water, and are cross-fertilized by the wind, but which remain closed when the water is unusually high, and then fertilize themselves, producing seeds which propagate the species.

Even the history of the orchids, that stronghold of insect agency, tends, from recent observations, to show that intercrossing is not so advantageous as it is supposed to be, since many tropical kinds, cited as especially adapted for intercrossing, are found to an enormous extent utterly barren, whilst several species which exhibit remarkable adaptations for close fertilization produce abundance of seed.

This would appear a startling contradiction to Darwin, until it is recollected that, with his usual candor, he points out the sterility of

many English orchids, and remarks that the bee ophrys is excellently constructed for self-fertilization, and that the fly and spider orchis are never visited by insects.

It is known that a great number of alpine plants grow beyond the height at which they can produce seed, and those growing on mountain pastures generally propagate themselves by bulblets. Many of our own very common plants do not set seed. The horseradish never produces any. The periwinkle spreads largely by runners. The varieties of peas keep true because they are not crossed by insects. The St. John's wort rarely sets seed. Poppies produce plenty of capsules when insects are excluded.

An argument, which may be used either way, is adduced by Darwin, whilst insisting on the greater size and vigor of the offspring of crossed flowers. "It might have been expected," he says, "that the seedlings from plants, the flowers of which were excessively sterile, would have profited in a greater degree by a cross than the seedlings from plants which were moderately or fully self-fertile, and, therefore, had no need to be crossed; but no such results followed." He also admits that there are no signs of degeneracy in the bee or other self-fertilized orchids, and that they are all vigorous growers.

The assertion that brilliant hues and full cups are designed as allurements to insects is abundantly contradicted by foreign botanists, who describe plants with conspicuously beautiful flowers, which are as much adapted to secure self-fertilization as others are for crossing, and many of our own native flowers, secreting much nectar and producing much pollen, are wholly disregarded by butterflies, flies, and bees.

That color variation is wholly attributable to insects is exceedingly doubtful, and that all the brilliant colors descended from the primeval yellow are due to their selective agency is so evidently a fallacious doctrine that very few words will be required to refute it. The doctrine is this: that the colors of flowers are intended to attract insects, and that certain colors are definitely intended to attract certain kinds of insects.

That flowers which lay themselves open for fertilization by miscellaneous small flies are white; those which depend on beetles are yellow. Butterflies prefer red, lilac or blue; and bees blue; blue flowers being, as a rule, specialized for fertilization by bees.

One of our recent poetic botanists asserts that, as the bee flowers grew bluer, the bees must have grown fonder and fonder of blue, and, as they grew fonder of blue, they must have more and more constantly preferred the bluest flowers.

Thus the special tastes of insects are supposed to be the selective agency for developing, white, pink, red, purple, and blue petals from the original yellow ones. But, we cannot help asking how could insects exercise any selective agency unless the petals had first shown any tendency to vary? We find no satisfactory answer to this question; but we have the following facts before us, which speak for themselves:

The pigments of colored petals are stored in the ordinary tissues of the plant, and a very small number is required to produce a seemingly endless variety.

The colored substances are in many cases the same as those left in the foliage from which chlorophyll has disappeared; so that bright petals are often exactly like leaves which have turned yellow and red in autumn, or the very red and yellow leaves of early spring.

White, which is the dress of so many flowers, is due simply to the reflection of light through colorless air-filled cells and tissues.

Black spots on flower or seeds, as, for example, on the garden bean, owe their origin merely to a concentration of dense violet pigment; and the blackness of so many berries is produced in the same way, by violet thickly heaped on in patches, which become, therefore, impenetrable to light. The apparently black berries of deadly nightshade contain a splendid violet, easily soluble in water and alcohol; with acid it becomes a purplish-red, and with ammonia, green. Setting aside chlorophyll green, which is only exceptionally a flower color, the remaining pigments are yellow, red, and blue; the two latter exist in the cell sap. Yellow is identical with the substance which, in the animal kingdom, goes under the name of lipochrome; and the color of the rind of an orange is due to the same pigment as is found in the yellow of the buttercup. It is only a denser deposit of it. The red of roses, pinks, and poppies, is due to a single pigment; it is just a matter of difference in intensity. It may be affected by the presence of an acid in the cells, and, sometimes, by the addition of a small quantity of lipochrome; not that a mixture of the two colors takes place in the cells, but that rose-red

in the sap and yellow in the protoplasm, found together in scarlet flowers, present just such a combination to our eyes, as when we set a red glass and a yellow one side by side, we see before us a mixture of the two colors.

By diminishing exposure to light, a complete alteration can be produced in the relative amount of coloring matter, although no invariable rule can be laid down as to its influence, since some flowers retain their color in darkness, whilst others lose it. Indeed, it has been affirmed that flowers produce their intensest colors in the dark, even if the whole plant is kept in the dark, but in such cases there can be no production of chlorophyll green. It may be mentioned that chlorophyll green is always accompanied by chlorophyll yellow, which is much less sensitive to light, and remains after the disappearance of the green.

It is well known that the soil has an immense influence on color, insomuch that many variations can be produced at will, and the mere transplantation of a plant will alter its color. Much care has to be taken as to the material in which tulips and other florist's flowers are grown, since if they should be too highly nourished they are apt to lose their distinctive stripes, to which they owe their marketable value. These brilliant stripes are due to bad variation, and it may be noticed incidentally that when branches become variegated by bad variation, and the variety is attempted to be propagated by seed, the seedlings are rarely variegated. But variation is much surer and more powerful than any change that can be effected by the crossing of flowers. Even a leaf inserted by its footstalk into the bark of the stock is sufficient to communicate variation to it, although the leaf soon perishes. Gärbner relates that branches of white and dark-fruited vines, which were split longitudinally, and then joined, produced distinct bunches of grapes of the two colors, and other bunches with berries either striped or of an intermediate or new tint. Darwin alludes to this, and observes, "These facts are the more remarkable because Andrew Knight never succeeded in raising variegated grapes by fertilizing white kinds by pollen of dark kinds." He also draws from this and similar cases the highly important physiological fact that the elements which go to the production of a new being are not necessarily formed by the male and female organs. They are present in the cellular tissue in such a state that they can unite without such aid.

That insects, attracted by conspicuous petals, or from a distance by scent, always presupposing that they are possessed of similar organs to our own, may have influence in the maintenance of colored species is not denied, for that would be to impair the rational doctrine of the survival of the fittest.

The cultivator who carries out a like selection corroborates its wisdom, but he does not depend alone on choice, and is well aware that he must make use of the many other means to attain his end. It is quite admitted that to the horticulturist the value of intercrossing is great. He may obtain finer flowers, to fetch a higher price, but it is much more than doubtful if, in the bare struggle for existence, the help of insects is indispensable; on the contrary, such absolute dependence on external agency must naturally be as much a source of hindrance as a want of self-reliance is to a man who desires to get on in his struggle for life.

The question is this: Is cross-fertilization actually necessary for the perpetuation of plants, or is it even so desirable as we are told that it is, and is color in flowers a mere expedient for getting themselves cross-fertilized? We know that brilliant hues undoubtedly exist, when, so far as we can see, they confer no benefit on their possessor; that some flowers are at their brightest when fertilization is over, and that there are large families which are wholly independent of insects, and yet show no signs of degeneration or extinction.

There is still another question: Is the development of beauty of no account in the plan of the universe? It is now distinctly stated that gay colors in fruit and flowers serve solely as guides to birds and beasts, in order that the fruit may be devoured and the seeds disseminated, and that it is a fallacious opinion that mere beauty and variety are objects in nature; but if such be the case, we must also give a reason for the rich attire of clouds, the harmonies of woodland shades, the sparkle of the streams, no less than for "the flower-inwoven mantle of the earth."

These utilitarian theorists, however, have not yet taken all the world by storm; there still exist careful observers who do not hesitate to believe in "Uselessness divinest of a use the finest," who see that the veil is not yet lifted, and who acknowledge that the greatest wizard is the man who best knows the secrets of the vegetable world. —*Phar. Jour. and Trans.*, June 5, 1886.

ON STROPHANTHUS, A HEART-POISON.

The pharmacological action of this poisonous African plant was mentioned by Pélikan, of St. Petersburg, in a brief communication to the Academy of Sciences of Paris, in 1865, and in the same year by Drs. Hilton Fagge and Gallois in a note appended to a paper on heart poisons. Prof. T. R. Fraser in the Proceedings of the Royal Society of Edinburgh, 1869, communicated the results of the chemical composition and of the action of the drug, and in 1877 Hardy and Gallois (See Am. Jour. Phar., 1877, p. 402) described some of the properties of the crystalline principle isolated by Fraser, and named it *strophantin*. In a paper read before the British Medical Association in 1885, Fraser stated that this crystalline body has a strongly bitter taste, a feeble acid reaction, is readily soluble in water and in rectified spirit, practically insoluble in ether, benzol and benzin, not precipitated by the ordinary reagents for alkaloids, free from nitrogen, and when heated with dilute sulphuric acid yields glucose and *strophantidin*, which is insoluble in water, very soluble in alcohol and has a strongly bitter taste. Strophantin is obtained from the alcoholic extract of the seed by dissolving in water, washing the solution with ether and evaporating the liquid at a low temperature. The seeds contain from 8 to 10 per cent. of strophantin and smaller proportions are present in the leaves and bark of the plant.

In the same paper referred to before, Prof. Fraser gives the results of his observations on the action of strophantin which is the same as that of the seeds. *A tincture of strophanthus* was prepared from $2\frac{1}{2}$ ounces of the powdered seeds and 2 pints (imperial) of rectified spirit, and occasionally the fat abundantly present in the seeds, was previously removed with ether. The tincture was given in doses of from 4 to 20 minims, twice or three times daily, and strophantin was injected subcutaneously, the quantity being 1-50 grain. In the latter case the beneficial influence upon the circulation of a single injection was ascertained to persist for eight days at least. Comparative experiments made upon the separated frog-heart showed that solutions of *digitalin* (made by Morson) of 1 part in from 100,000 to 4000 parts produced characteristic changes in the heart's action, but were not sufficiently strong to kill the heart within two hours; and that a solution of *strophantin*, 1 in 6,000,000, produced characteristic changes in the heart's action, and complete stoppage of the contractions in extreme

systole in about 20 minutes. In a frog whose central nervous system had been destroyed, a solution of digitalin, 1 in 20,000, passed through the blood vessels produced in 6 or 7 minutes extreme contraction of the vessels; but no decided effect was observed with strophantin in solution 1 in 3000, and a temporary effect merely with a solution 1 in 2,000. Strophanthus, therefore, exerts a much more powerful action upon the heart, and a less powerful action upon the blood vessels than digitalis.

The *Kombé* arrow poison, in some places also called *inée, onage* or *onaie,* is supposed to be derived from Strophanthus hispidus, *DeCand.*, or from St. Kombe, *Oliver,* described in *Icones Plantarum,* Nov. 4, 1870. Some of the seeds supplied to Prof. Fraser from the Shiri valley, near Lake Nyassa, were sown in the Royal Botanic Gardens, Edinburgh, and the plants were shown by Mr. E. M. Holmes (*Phar. Jour. and Trans.*, March 13, 1886), to differ from both the above species. In the fruit of St. hispidus, collected in Dr. Baikie's Niger Expedition and preserved in Daniel Hanbury's collection, the naked portion of the awn above the seed is about one inch in length, and the hairs on the seed are of a brown color. A specimen from Messrs. Burroughs and Wellcome consists of striated and smooth follicles, the latter believed by Mr. Wellcome to have been scraped; the seeds in both are alike, are rather larger than those of St. hispidus, with paler hairs, and with the naked portion of the awn nearly two inches in length. Apparently identical with this is a specimen from Rev. H. Waller, while a fourth specimen from Mr. H. B. Moir, is a much shorter follicle with seeds having pale hairs and an awn, the naked portion of which is one inch long. Therefore, two forms of pods and seeds come from the district between Zanzibar and Lake Nyassa; both differ from St. hispidus, and it is uncertain whether one of them may be derived from Strophanthus Kombe. If St. hispidus should be found to have the same therapeutical value as the one experimented with by Prof. Fraser it could probably be more readily and cheaply obtained from Sierra Leone, than the species from Eastern Africa. The latter is procurable only at a very extravagant cost, as we have been informed by Messrs. Burroughs, Wellcome & Co., to which firm we are indebted for specimens of this drug, which they are at present offering in the form of tincture put up in ½ oz. vials. This, we believe, is the only form in which the new remedy is as yet to be had in the American market.

J. M. M.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Quinine Hydrates.—The only crystallized quinine hydrate now known is prepared by Prof. Flückiger (*Phar. Jour. and Trans.*, April 24, 1886, p. 897) by adding ammonia to an aqueous solution of the officinal quinine sulphate saturated at about 15° C. (59° F.) until the precipitate is redissolved; after some days fine tufts of crystals make their appearance, which at 120° C. (248° F.) lose 14,24 per cent., or 3 molecules, of water. By precipitating the same quinine solution with just sufficient ammonia water, an *amorphous* hydrate of the same composition is obtained. An amorphous hydrate with $2\,H_2O$ (10.13 per cent.) is precipitated by ammonia from a concentrated solution of quinine sulphate prepared with the aid of sulphuric acid. The existence of Fletcher's monohydrate seems to be doubtful. A hydrate with $8\,H_2O$ was prepared by Hanamann in 1863, and one with $9\,H_2O$ by Oudemans in 1873. The benzol compound $(C_{20}H_{24}N_2O_2)_2+C_6H_6+2\,OH_2$, described by Wood and Barret in 1883, has also been obtained by Flückiger.

Labdanum of Cyprus.—W. T. Thiselton Dyer procured from H. L. Thompson, the Commissioner of Papho, for the Kew Museum the instrument used for the collection of labdanum, and which is substantially the same as the Cretan ladanisterion, though differing in some slight details as to form, and having strings instead of leather thongs. —*Phar. Jour.*, 1886.

Minnesota Opium.—During the year 1885 Emil Weschcke experimented on the cultivation of different species of Papaver at New Ulm, Minn., and from the unripe capsules of P. somniferum prepared a quantity of opium which, in the air-dry condition, contained 2.8 per cent. of moisture, and, after drying, yielded 15.230 per cent. of morphine, 0.325 per cent. of narcotine, 0.416 of codeine and 3.500 per cent. of meconic acid. The author does not believe that the cultivation of the poppy for the production of opium in this country would be attended with profit.—*Contrib. Dep. Phar., Univ. Wisc.*, 1886, pp. 10–18.

Yellow Opium Mold.—Prof. Wm. Trelease examined the bright yellow fungus which is sometimes observed on opium. It is the Eurotium herbariorum, *Link*, and this was shown in 1854 by DeBary to be the ascosporic fruit of one of the common green molds, Asper-

gillus glaucus, *Lk*, and has therefore been named Erotium Aspergillus-glaucus *Lk*. The paper is accompanied by drawings of the fruiting parts.—*Ibid*, pp. 4–9.

Reactions of Fixed Oils.—Thos. Maben (*Phar. Jour. and Trans.*, March 20, 1886, pp. 797–800) obtained from the Indian collection at the Forestry Exhibition in Edinburgh, samples of the oils of apricot (Prunus Armeniaca), peach (Prunus Persica) and walnut (juglans regia), and compared their reactions with those of oil of almond. The test with *nitric acid* was applied by shaking vigorously together two fluid drachms each of the oil and pure nitric acid, sp. gr. 1.42, and noting the color at the end of five minutes, an hour, and five hours. For the *sulphuric acid* test, 10 drops of the oil are placed on a white tile, and 2 drops of strong sulphuric acid are dropped in the centre of the oil. The *chloride of zinc* test is applied in the same manner, but 5 drops of the reagent are used, and this is prepared by making a saturated solution of oxide of zinc in strong hydrochloric acid. In the following table, walnut oil alone is a drying oil.

	Apricot Oil.	*Peach Oil.*	*Almond Oil.*	*Walnut Oil.*
Specific gravity at 60° F.....	.9204	.9232	.918	.9264
Freezing point....	–20° C., slightly viscid.	–20° C., slightly viscid.	–20° C. (–21.5°), opaque and viscid.	–20° C. (–27.5°), viscid & slightly opaque.
Saponification: 1000 parts require.....	181.4 KHO	189.1 KHO.	183.0 KHO.	194.4 KHO.
Bromine absorbed by 100 parts of oil.....	70.0	77.0	53.74	90.5
Nitric acid.....	Coffee-brown.	Dark brown.	Action slight.	Dark brown.
Sulphuric acid.....	Light brown to red brown.	Dark brown.	Yellow to orange.	Dark brown to purple.
Chloride of zinc...	Muddy brown with shade of purple.	Purple brown.	No action.	Muddy brown.
Elaidin test.....	Light yellow, hard.	Citron yellow, soft.	White, hard.	Does not solidify.

Products of Maize.—A brief notice was given in this Journal, 1885, page 404, of a process elaborated by Dr. F. V. Greene, U.S N., for extracting the oil and albuminoid matter from corn. The Franklin Institute has recently awarded the John Scott Legacy Medal for this process, by which the waste products of starch works and other industries may be utilized.

Anchusa tinctoria, Lin.—Four samples of alkanet root were tested by C. J. S. Thompson (*Phar. Jour. and Trans.*, April 10, 1886, p. 860) for the amount of anchusin, by following Pelletier's process, the root being exhausted with ether. The coloring matter varied between 5.25 and 6.02 per cent. It is red, resin-like, insoluble in water, soluble in oils, alcohol, chloroform and ether, and with a rich, deep-blue color in alkali hydrates, the color changing again to crimson on the addition of an acid. The author regards anchusin as being quite as delicate a test as litmus.

Irvingia Oliveri, Pierre; Simarubaceæ.—Mr. J. B. Vignoli obtained in 188- a specimen of *cay-cay wax*, which is a product of the above-named tree, according to Mr. Pierre, director of the botanic garden at Saigon. Mr. Vignoli (Thèse, Montpellier, 1886,) gives a full botanical description of the tree, which is common in the forests of eastern Cochinchina, and has also examined the anatomical structure of the branches, leaves and fruit. The fruit is an ovoid yellow drupe, of the size of a lemon and with a fibrous mesocarp, and contains a seed of the size of an almond, having a brown, smooth and brittle testa, and containing a large embryo and a small quantity of albumen. For preparing the fat, the seeds are exposed by the natives to the sun for some time, then bruised, exposed to steam and then expressed, the yield being about 20 per cent. of the fresh seeds. The dried seeds weigh on the average 0·7 gm., and on being treated with carbon disulphide yield 52 per cent. of fat.

The cakes of cay-cay wax are usually in the form of truncated cones, weighing about 2·5 kilos. It is of a grayish-yellow color, unctuous to the touch, and has a peculiar odor, becoming stronger and disagreeable when heated. It is readily soluble in ether and carbon disulphide, also in hot alcohol, but dissolves sparingly in cold alcohol. At 37° C. it becomes soft, melts at 38°, and solidifies again at 34°. It is easily saponified, and yields 68·7 per cent. of fatty acids, 30·2 of which is oleic acid, the remaining acids being probably stearic, and several of those liquid at the ordinary temperature.

Cay-cay wax is only used for candles by the natives, bamboo joints being the moulds. These candles give a light somewhat inferior to that of stearin candles, and when burning do not give off a disagreeable odor.

Horse-chestnut Leaves.—The Sapindaceæ being botanically closely related to the Erythroxylaceæ, it was deemed of interest to ascertain

whether the leaves of Æsculus Hippocastanum, *Lin.*, contain cocaine or an alkaloid having analogous properties. F. O. Ray treated the leaves according to the improved process of Dr. Squibb for the assay of coca leaves (*Ephemeris* II, 784, May, 1885), and also according to the process recommended by Dr. A. B. Lyons (Am. Jour. Phar., 1885, p. 466), but without obtaining any decided reaction for an alkaloid. Other experiments, made for the purpose of determining the presence of a volatile alkaloid, of a volatile acid, or of caffeine (which is present in the seeds of Paullinia sorbilis, *Martius*), gave likewise negative results, and it was ascertained that æsculin, which is abundantly contained in the bark of the horsechestnut, is apparently entirely wanting in the leaves.

Gehe & Co. (*Phar. Zeitung*, 1885, No. 78) obtained from horsechestnut leaves traces of a volatile liquid alkaloid, colored red by sulphuric acid, and probably identical with a similar substance contained in coca leaves.—*Contrib. Dep. Phar., Univ. Wisc.*, 1886, pp. 27, 28.

The Leaves of Acer dasycarpum, Ehrhart, the white or silver maple, were examined by Emil Weschcke, the results being quite analogous to the foregoing. Traces of a substance were found affording reactions similar to those of alkaloids; and ether extracted from alkaline solutions a very small amount of a neutral crystallizable principle, which was not further examined.—*Ibid*, p. 29.

APPRENTICE EXAMINATIONS.

At the meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held February 2d, 1886, the following remarks were made by Wallace Procter :

"The subject of preliminary examination of the applicants for tuition in the college, has from time to time come before the Board for discussion and action. In my opinion, the present method dividing the inquiry into the capacity of the student into three parts, eligibility for the final examination depending on his success at those preceding it, is the best yet devised. The test scholarship is strictly applied, while the ability of the pupil to profit by didactic teaching, illustration and the accompanying necessary study is fully tested.

Now we know that many who present themselves for the technical teaching of a school of pharmacy, are deficient in the primary knowledge, so essential to the successful prosecution of the study of the higher branches of scientific knowledge taught therein.

Now what is the remedy for this? And how can it be applied?

To me it seems that the responsibility lies with the master or employer who first takes the green hand and attempts to fashion him into a pharmacist. He

would not attempt to build a house without a foundation! Why should he expect to form an accomplished druggist without some investigation of the fundamental acquirements of the applicant for instruction. If deficient in the ordinary branches of an English education, his orthography bad, syntax worse and the mysteries of the rule of three a sealed book to him, how can he be expected to do justice either to himself or to his instructor? It is unfair to the young man to encourage him to undertake the difficult but necessary curriculum of a college of pharmacy, if he has not arrived at a point which will render earnest and effective study possible.

It will be said that the employer himself should thoroughly test the applicant's fitness and knowledge before receiving him as an apprentice. Very true, but how many have the time, the inclination, or sometimes even the readily available ability to arrive at the desired conclusion.

Now, I would suggest that this might be accomplished under the auspices of this college, in a manner which would be satisfactory to all concerned.

Let there be held in the college building at stated periods, either monthly or bi-monthly, an examination. Let it be conducted either by the Committee on Examination, or a special Committee for the purpose; let it consist of questions in geography, elementary grammar, arithmetic and composition; orthography and chirography to be estimated therewith.

The results communicated to the applicant, if favorable, to be simply a statement that, in the judgment of the Committee, he is sufficiently advanced to enter a drug store. If unfavorable, no publicity should be given to the fact. Let there be a record kept by the actuary of all who have passed, open to the inspection of employers.

It would probably be advisable to exact a nominal fee, though this would be a subject for consideration.

If such a plan should be adopted, the young man, before seeking a situation, could be examined, or the prospective employer could insist on his passing before considering his application further.

In this way, members and others, without trouble to themselves, might be assured that their apprentices had, at least, the ground-work on which to build, and could proceed to impart technical knowledge with much greater prospect of satisfactory progress. I would suggest that a committee be appointed to consider the matter and elaborate a plan for its practical application."

A committee, consisting of Wallace Procter, William J. Jenks, Alonzo Robbins, Wm. B. Thompson and Daniel S. Jones, was appointed to report on the advisability of the adoption of the above suggestions. This was presented at the April meeting of the Board, and was adopted. It favored the appointment of a committee to carry the plan into effect at the earliest period, deemed advisable. This Committee consists of Messrs. Wm. B. Webb, chairman; W. Procter, Wm. B. Thompson, Dr. A. W. Miller and Gustavus Pile. This Committee has, after a number of meetings, formulated rules for its guidance, determined the scope of the examinations, and adopted the title which heads the foregoing. The first "Apprentice Examination" will be held Wednesday, September 15th, at 3 p. m., in the Museum of the College. It will consist of questions in elementary grammar, geography, arithmetic,

not further than simple proportion, and a composition on some specified subject. Application must be made to the Actuary, Thos. S. Wiegand, at least one week prior to that date, a fee of two dollars to be deposited at the time which will be returned in case of failure to pass. The record of successful applicants will be made as full as possible, embracing all information obtainable that will be of probable use to employers in search of assistants. The existence of such a register will be of material aid to those desiring properly qualified apprentices, and would become the recognized means of bringing together the employer and his juniors. It is earnestly desired that members of the College and all others interested in the advancement of our profession should avail themselves of these efforts in their behalf, and make the possession of the Apprentice Examination Certificate a necessity to entrance into their stores, unless they are fully satisfied that the applicant has the requisite foundation. Young men desiring to enter upon the study of pharmacy will find in this certificate a pass-port of available value in their search for employment, and there is no room for doubt that rejections for defective scholarship at the Junior examinations would be materially lessened in number and the standard raised.

By order of Committee, WALLACE PROCTER, *Secretary.*

MINUTES OF THE COLLEGE MEETING.

PHILADELPHIA, JUNE 28, 1886.

A stated meeting of the members of the College was held this day, in the hall, 145 N. 10th street, at 3.30 p.m., seventeen members present, Chas. Bullock presiding. The minutes of the previous stated meeting were read and adopted. The minutes of the Board of Trustees for April, May and June were read and accepted.

The report of the delegates to the meeting of the Pennsylvania Pharmaceutical Association, held at Lebanon, was not formally presented. Mr. Alonzo Robbins, however, made a verbal statement, noting, among other facts, the resolution of the State Association to meet in Philadelphia, June, 1887. Mr. W. J. Jenks moved that the rooms of the College be placed at the disposal of the State Association, and that that body be invited to occupy them. Motion adopted.

The application of Mr. Thos. H. Franklin, of Philadelphia, for membership in the College was presented by the Secretary, and, on motion, referred to the following as Committee: Jos. P. Bolton, Thos. S. Wiegand and William B. Webb.

Prof. Maisch read a communication from M. P. Dorveaux, Librarian of the "Ecole Supérieure de Pharmacie de Paris," acknowledging receipt of volumes of the AMERICAN JOURNAL OF PHARMACY contributed by this College to the library of that institution.

On motion to elect delegates to the next session of the American Pharmaceutical Association, which meets at Providence, R. I., in September, the following gentlemen were nominated: Alonzo Robbins, Robt. England, Gustavus Pile, Edward C. Jones and Henry Trimble. On motion of Mr. W. E. Krewson,

Mr. T. S. Wiegand was directed to cast ballot for these gentlemen, which being done affirmatively, they were declared duly elected.

Mr. W. J. Jenks moved the election of a *Curator*, in place made vacant by decease of Mr. C. F. Zeller, and nominated Mr. Jos. W. England. Mr. W. E. Krewson moved that an affirmative ballot be cast by Mr. T. S. Wiegand—this was formally done, and Mr. England declared elected.

A motion to adjourn being suggested, the same was made and carried.

W. B. Thompson, *Secretary.*

EDITORIAL DEPARTMENT.

Potatoes.—We are indebted to Mr. W. B. Brownscomb, of Richmond, Victotoria, Australia, for a communication on the results of the experimental culture of Solanum tuberosum, var. boreale, of which we were enabled in the latter part of 1884, to send a few tubers to Mr. Jos. Bosisto. Two tubers weighing 30 grains, were planted Feb. 20, 1885, the first crop in August yielding tubers weighing 7 dwt. On November 4th these were again planted, and on March 10th last, they were lifted, the result being 18 oz. The plants have flowered and seeded profusely, and it is calculated that next season the yield will be 4 to 5 cwt. The tubers received from the second Australian crop are being cared for by Mr. G. W. Kennedy, of Pottsville, while the same variety, the remnants of our unsuccessful culture, together with the specimens of Solanum Maglia, received from Messrs. Sutton & Sons, Reading, England, are in the care of Mr. J. H. Redsecker, Lebanon, Pa.

Deserved Honor.—At the commencement held June 30th, the regents of the University of Michigan conferred the degree of Doctor of Philosophy, *honoris causa*, upon Professor Albert B. Prescott, M. D., director of the chemical laboratory, and dean of the school of pharmacy at Ann Arbor.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Gray's Botanical Text-book, Sixth Edition, Vol. II. Physiological Botany. By George L. Goodale, A.M., M.D., Professor of Botany in Harvard University. New York and Chicago: Ivison, Blakeman, Taylor & Co. 8vo, pp. 499. Price, $2.00.

The fifth edition of Prof. Gray's Structural and Systematic Botany was issued in 1857. Since then many new and important observations and discoveries have been made in botany, and when about six years ago a new edition was announced, it was found that the new facts and the general scope of the science, as developed by the modern researches, were such as to render a division of the former work desirable. The first volume of the sixth edition, which then made its appearance, was confined to the morphological structure and development of plant organs, and to the general principles of classification and plant description. During the past winter the second volume, written by Prof. Goodale, was published, and is now before us.

The volume is divided into two parts, of which the first one treats of the

histology of phænogamous plants, with an introductory chapter on microscopes, dissecting instruments and other appliances necessary or useful in prosecuting the study of vegetable anatomy. Next is considered the cell, comprising structure, composition and principal contents; and this is followed by a chapter on the modifications and kinds of cells and the tissues they compose. The following chapters are devoted to the consideration of the anatomy and development of the different plant organs, root, stem, leaf, flower, and of the fruit and seed; and conclude with a brief physiological classification of tissues.

The second part of the volume treats of vegetable physiology, commencing with protoplasm in its various relations, and proceeding to the absorption and diffusion of liquids, to the different soils, to the transfer of water and transpiration, to assimilation, to the changes of organic matter, and to vegetable growth, the latter including the division and growth of cells with its conditions and effects under various influences. The remaining chapters treat of the movements of plant organs, of the process of reproduction, of the ripening and germination of seeds, and of the resistance of plants to untoward influences, such as heat, cold, light, poisons, etc.

The brief outline here given shows that the volume aims at giving a complete exposition of the phenomena of plant life, its conditions, processes and results; and on examining the different chapters, it will be readily noticed that the voluminous material—new and old—has been arranged and handled in a comprehensive and attractive manner, rendering it pleasing to the attentive student. The numerous good woodcuts, over 200 in number, add considerably to the value of the work.

The greater portion of Prof. Goodale's work is directly applicable to the botanical studies of the pharmaceutical student, and supplements the first volume, Prof. Gray's organography. Both subjects being indispensable adjuncts of the study of vegetable materia medica, the sixth edition of the "Botanical Textbook" should be found in the library of the pharmacist, whose aims reach beyond the mere superficial knowledge of the character and nature of the drugs of vegetable origin.

It should be mentioned yet that to the second volume has been added "suggestions for studies in histology and physiology of phænogams," which will be found of great value to the beginner as well as the advanced student.

General Index to the Year-book of Pharmacy for the years 1864 to 1885 inclusive. London: Published for the British Pharmaceutical Conference by J. & A. Churchill. 1886. 8vo, pp. 246.

This very acceptable publication renders available the material contained in the twenty-two issues of "Proceedings" and "Year-book" thus far published by the British Pharmaceutical Conference.

Practical and Analytical Chemistry, being a complete course in chemical analysis. By Henry Trimble, Ph.G., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. Second edition, revised, enlarged, and illustrated. Philadelphia: P. Blakiston, Son & Co. 1886. 8vo, pp. 110.

The first edition of this work was noticed in detail in the Journal for September, 1885. The necessity of issuing a second edition within the first year

shows that the work has been favorably received. In the present edition, equations have been added in explanation of the reactions of reagents with salts, and the acids have been arranged in three groups, two for the inorganic and one for the organic acids. The study of the latter is a source of difficulty to the beginner, more so than that of the bases; a systematic arrangement of the former is desirable, and may, we think, be carried further with advantage to the student in laboratory work.

Laboratory Calculations and Specific Gravity Tables. By John S. Adriance, A.B., Fellow of the Chemical Society. New York: John Wiley & Sons. 1886. pp. 71. Price, bound, interleaved, $1.00.

The book contains a number of tables, which are useful in laboratory work as substitutes for laborious calculations. The selection of the tables appears to have been judiciously made of such which are likely to be frequently used. The calculations of percentage composition, conversion factors, etc., have been based on the atomic weights as lately determined by Prof. F. W. Clarke.

Proceedings of the Fifth Annual Meeting of the Nebraska State Pharmaceutical Association, held at Omaha, May 11 to 13, 1886. 8vo, pp. 83.

For a brief account of this meeting see July number, p. 361.

Report on Agricultural Colleges and Experimental Farm Stations, with suggestions relating to experimental agriculture in Canada. By Prof. William Saunders, F.R.S.C. Ottawa. 1886. 8vo, pp. 80.

This has been printed as part of the report of the Minister of Agriculture for 1885.

The Merchants' Legal Hand-book. By Emerson Bennett, Jr., and George D. Domsler, Attorneys, etc. Philadelphia. 1886. pp. 32.

There having been no general revision of the Pennsylvania laws since 1836, this pamphlet has been prepared with the object of giving a brief synopsis of the laws relating to the collection of debts, estate of deceased, deeds, mortgages, mechanics' liens, partnership and others.

Zur Erinnerung an Scheele ein Jahrhundert nach seinem Ableben. Von F. A. Flückiger, 8vo, pp. 50.

In remembrance of Scheele a century after his death.

This valuable memoir is a reprint from *Archiv der Pharmacie.*

Ueber die Halogenadditionsprodukte der Propylchinolinhalogenüre und ein daraus gewonnenes Monobromchinolin. Von Friedr. Collischonn. Freiburg, Baden. 1886. 8vo, pp. 69.

On the halogen-addition-products of the propylquinoline halogen compounds, and on a monobromquinoline obtained therefrom.

An inaugural dissertation for the degree of doctor of philosophy.

Bulletin of the North Carolina Board of Health. Nos. 2, 3.

The Relation of the State and the Medical Profession. Address before the Alumni Association of the University of Michigan. By Chas. J. Lundy, A.M., M.D. pp. 12.

Homœopathy as viewed by a Member of the Massachusetts Medical Society. Address before the Hahnemann Society, etc., by V. Y. Bowditch, A.B., M.D. Pp. 29. Reprint from the *Boston Med. and Surgical Journal.*

Erysipelas and other Septic and Infectious Diseases incident to Injuries and Surgical Operations prevented by a method of Atmospheric Purification. By David Prince, M.D., Jacksonville, Ill. Reprint from the *Amer. Practitioner and News.*

An Accidental Divulsion of a Pterygium leading to an Improvement in the Regular Operation. By A. E. Prince, M.D., Jacksonville, Ill. From *Archives of Opthalmology.*

Ichthyol und Resorcin als Repräsentanten der Gruppe reduzierender Heilmittel. Von Dr. P. G. Unna. Hamburg und Leipzig: Leopold Voss. 1886. 8vo, pp. 85. Price, mark 1·60.

Ichthyol and resorcin as representatives of the group of reducing remedies.

OBITUARY.

Dr. Otto A. Ziurek died in Berlin May 11th, aged 65 years. He was a pharmacist, but devoted his time to analytical chemistry, and more particularly to the analysis and valuation of technical products and of articles of food. For many years he was one of the most competent official chemical experts of Prussia. He was the author of a "Hand-book of Pharmacy" and of several other valuable treatises.

Dr. Julius A. Stoeckhardt died in Tharand, near Dresden, June 1st, in the 77th year of his age. He was a pharmacist, but for nearly fifty years taught chemistry, and was, since 1847, professor of chemistry at the Agricultural Institute of Tharand, acting also as inspector of pharmacies of Saxony. He was the author of numerous essays on agricultural subjects, and of the "Schule der Chemie," a work which was translated into several languages, and passed through nineteen editions in Germany within 40 years.

Prof. Chas. Froebel died of erysipelas in New York, June 19th last, at the age of 50 years. He was a native of Germany, and came to this country at the age of 13 years, with his father, Julius Froebel, who is well known as an author. After completing his elementary education, Charles Froebel studied natural history at Freiburg, and continued his chemical studies under Prof. Genth, of Philadelphia. In 1873 he became Professor of Analytical Chemistry at the New York College of Pharmacy, which chair he vacated a few years ago. Since that time he was mostly engaged in literary labors.

William C. Gill, Ph.G., class 1873, died in this city, June 22d, of pneumonic phthisis, aged 34 years. For some years he was engaged in business in the northern part of Philadelphia.

Asher C. Nagle, Ph.G., class 1881, engaged in business at Youngstown, O., died at his former home at Heckertown, near Easton, Pa., on June 18th, aged 28 years.

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SEPTEMBER, 1886.

EXAMINATIONS OF AMERICAN DRUGS.

(Abstracts from Theses.)

Xanthoxylum fraxineum, Willdenow.—Edward T. Moffit, Ph.G., examined this bark and found the air-dry powder to retain 8 per cent. of moisture and to yield 11·08 per cent. of ash, one-fifth of which was soluble in water, and three-fourths soluble in hydrochloric acid, a little silica being left undissolved. Treatment with benzin yielded 3·2 per cent. of greenish fixed oil mixed with a crystalline resin, the latter being doubtless identical with that previously observed by Lloyd (AMER. JOUR. PHAR., 1876, p. 226), and by Colton (*Ibid.*, 1880, p. 192). Ether now extracted from the powder 4·34 per cent. green acrid resin, and absolute alcohol gave 2·70 per cent. of extract, consisting of resin, a little sugar, tannin, coloring matter, precipitated by basic lead acetate, and an alkaloid which was isolated by adding ammonia, agitating with chloroform and evaporating the latter when yellowish crystals were left. These were soluble in alcohol and chloroform, insoluble in benzin, ether and benzol, had a slighly bitter taste, produced with nitric acid a yellow solution, with sulphuric acid a brown color changing to dark red, and precipitates with the following reagents : Potassio-mercuric iodide white flocculent; auric chloride reddish-brown and red; platinic chloride brownish-yellow; picric acid yellowish; tannic acid grayish-yellow. The alkaloid is doubtless identical with that obtained by Colton (*Loc. cit.*, p. 193) from Xan. carolinianum, but this is stated to be insoluble in chloroform.

Further treatment of the powder showed the presence of sugar, gum, bitter extractive and albuminoids, and the absence of starch.

Kalmia angustifolia, Lin.—This small shrub is known as dwarf-laurel or lambkill, and is reputed to be poisonous to sheep. Thos. I. Deibert, Ph.G., collected several pounds of the leaves which on drying by exposure to the air lost 64 per cent. in weight; the loss of air dried leaves at an elevated temperature was 10 per cent. They were

coarsely powdered, boiled with water, the decoction precipitated with basic lead acetate, the filtrate treated with H_2S, again filtered and evaporated; the soft extract was treated with alcohol, and the filtrate on evaporation yielded an extract like mass in which minute crystals could be seen with a magnifying glass, and which, dissolved in water, yielded with ammonia and phosphomolybdic acid a beautiful blue color. The mass probably contained arbutin.

Exhausted with benzin the leaves yielded a soft sticky extract, containing wax, resin and fixed oil; it did not give a blue color with ammonia and phosphomolybdic acid. The leaves, previously treated with benzin, gave an alcoholic tincture containing considerable tannin, and subsequently yielded an infusion in which gummy matters were present. The air-dry leaves yielded $3\frac{1}{2}$ per cent of ash.

Plantago major, Lin.—The leaves of this plant were examined by David Rosenbaum. Petroleum benzin extracted 4 per cent. of wax and chlorophyll, the extract fusing at 83° C. Ether dissolved 4·4 per cent. of resin and chlorophyll. The alcohol extract weighed 10 per cent., 6 per cent. being soluble in water, this portion containing considerable sugar; the remaining 4 parts were dissolved by ammonia. The soluble matter taken up by water weighed 13 per cent., 7·2 of which was insoluble in 66 per cent. alcohol. Soda solution dissolved 6 per cent., and diluted acid 10 per cent., the latter containing a notable quantity of calcium oxalate. The bleached lignin weighed 35.5 per cent. The powdered leaves contained 8 per cent. of moisture and yielded 12·85 per cent. of ash, 2·85 of which was soluble in water and 9·50 soluble in hydrochloric acid. Tannin, saponin, alkaloid, etc., were not found.

It will be of interest to mention in connection with the above the results obtained by Th. Koller, in 1868 (*N. Jahrb. d. Phar.*, xxx, 139), with the leaves of Plantago major, lanceolata and media; he found them to contain chlorophyll, resin, wax, albumin, pectin, citric acid and oxalic acid.

Hamamelis virginica, Lin.—Witchhazel bark has been subjected to analysis by Walter B. Cheney, Ph.G., with the following results: The yield of ash was 6·16 per cent, and it consisted of sulphate, chloride, phosphate and carbonate of potassium, sodium and magnesium, manganese and silica. The air-dry powder contained 9·75 per cent. of moisture and yielded 1·15 per cent. of benzin extract, which was also soluble in ether, absolute alcohol, benzol, chloroform and oil of tur-

pentine, and consisted mainly of wax saponifiable by alcoholic solution of soda. The powdered bark now gave with ether 7·65 per cent. of hard greenish extract of which nearly two-thirds was soluble in water, this portion containing tannin but no alkaloid or glucoside; the remaining resin was soluble in alcohol. Absolute alcohol extracted from the remaining powder 6·4 per cent. of soluble matter, fully two-thirds of which was soluble in water, and the remainder in ammonia; tannin and a little sugar were found to be present, but no indication of the presence of an alkaloid or other crystalline principle was obtained. The watery extract amounted to 5·74 per cent., of which 1·2 per cent. was glucose, besides mucilage and other principles. Soda solution extracted 1·75 per cent., including ·25 per cent. of albuminoids, and dilute acid took up 4 per cent., leaving half its weight of ash. The bleached cellulose weighed 57·61 per cent. The total amount of sugar, determined by Fehling's solution, was 1·4 per cent., and the tannin, weighed as gelatin precipitate, was 6·75 per cent. The search for an alkaloid or glucoside gave negative results.

Smilax rotundifolia, Lin.—It has a creeping pale yellowish rhizome many feet long, about $\frac{1}{4}$ inch thick, with internodes 4 to 6 inches in length, the nodes considerably thickened and each marked by a prominent brownish triangular leaf scale, and beset with some fine light-colored rootlets; the rootlets are more numerous near the growing end and are of a brown color. The dried rhizome is brittle, has little or no odor and has a somewhat bitter and slightly acrid taste. Arthur H. Cohn, Ph.G., collected the rhizome for investigation, and obtained from the air-dry powder 2·3 per cent. of ash, and by treatment with benzin ·05 per cent. of wax; with ether ·5 per cent. of resin, and with alcohol 2·8 per cent. of extract, the latter probably containing a glucoside, as indicated by the reactions. More of this principle was shown to be in the aqueous infusion, but it was not isolated. The presence of gummy matter, sugar, pectin, starch, etc., was ascertained; also the absence of calcium oxalate.

Equisetum hyemale, Lin., is to some extent employed as a remedy in dropsical affections. Frank J. Young, Ph.G., has known it to be prescribed in infusion together with digitalis and potassium acetate; but from the results of his analysis comes to the conclusion that the effects of the medicine would have been the same if the equisetum had been omitted. The air-dry drug yielded 18·2 per cent. of ash, consisting mostly of silica. Petroleum benzin exhausted from the pow-

der 1·4 per cent of a brownish-green semi-liquid fixed oil, which was readily saponified and was soluble in ether, chloroform and carbon bisulphide. Ether now took up 5·33 per cent. of a green semi-solid resin, soluble in chloroform, benzol and absolute alcohol, and imparting to water or acidulated water a greenish color, but no decided taste. Alcohol dissolved from the residuary powder 1·60 per cent. of resinous extract, free from tannin, alkaloid and glucoside. The powder gave to water 4·84 per cent. of extract, of which 2·25 per cent. were shown to be sugar by Fehling's solution, and 0·60 per cent. of mucilaginous matter was left undissolved by alcohol of 66 per cent.

SALICYLIC ACID AND MONAD SALTS.

By R. Rother.

It is known that the solution of salicylic acid in water is enormously augmented by the presence of certain salts of the monad metals, and that the resulting solutions have the physiological effects of free salicylic acid. It was, however, shown that in these combinations the acid is not free in any sense, but that normal salicylates and acid monad salts are formed.

In consideration of these facts, the writer attempted the solution of benzoic and gallic acid on the same principle.

It was found that benzoic acid is entirely inert in this connection under the usual circumstances, but that it liberates some acetic acid from potassium acetate on heating their mixture.

Gallic acid is much more energetic but adversely so as it generates sparingly soluble monad gallates.

Trials were then made with salicylic acid and various other salts than those heretofore used in such cases. It was found to have no effect with sulphates and hypophosphites, but it readily decomposed tartrates, pyrophosphates and borates. There are doubtless many other such saline combinations producible in this manner, but no others were sought.

This peculiar reaction led to the question of its special chemical character and the subsisting interrelations of the products. Hence the writer examined acetates, citrates, tartrates, phosphates, pyrophosphates and borates.

POTASSIUM ACETATE AND SALICYLIC ACID.

The addition of acetic acid to a simply aqueous solution of a sali-

cylate causes the precipitation of crystalline salicylic acid in profusion. It is therefore apparently remarkable that a normal acetate as abundantly dissolves free salicylic acid. It seems furthermore doubly strange that one molecule of the acetate conditions the solution of one molecule of the acid. This solution is however but temporary as it gradually deposits a considerable proportion of free acid. When this liberated acid is reconverted into potassium salt and reunited with the remaining solution no subsequent separation occurs, not even in the presence of any amount of excess of acetic acid. This result shows that a certain proportion of potassium acetate is essential to keep all the salicylic acid in solution in the presence of acetic acid largely in excess. It was found that this is effected when three molecules of the acetate react upon two molecules of salicylic acid, that is, in the proportion of 294 parts of the first and 276 parts of the second. Since the commercial potassium acetate is always more or less damp and indefinite, it is better to employ instead, 300 parts of perfectly dry and well crystallized potassium bicarbonate neutralized with acetic acid aided by warmth. The expression for the reaction is written

$$3(KAc)+2(HSl)=2(KSl)+KAc(HAc)_2.$$

This makes it apparent that only enough acetic acid is displaced to generate one molecule of acid potassium acetate which then protects two molecules of the salicylate in the presence of more acetic acid. This solution, when moderately dilute, has a not unpleasant acidulous taste and hence widely different from the nauseous flavor of unmixed salicylate.

Pure potassium salicylate, when crystallized on a slide and viewed under the microscope, is seen to be in the form of stellate groups having a fine appearance in polarized light. When, however, crystallized in a similar manner from the acetate solution it is presented in a greatly improved shape, being especially elegant under the polariscope. It is best seen with a half inch objective. The rays constituting the star crystal emanate from a common center without intercrossing. The rays thicken towards their middle and then again attenuate. They have a rather irregular contour and in the finest samples appear slightly curved.

POTASSIUM CITRATE.

Salicylic acid is abundantly dissolved by potassium citrate. The somewhat dilute solution has an acidulous not disagreeable taste.

Three molecules, 414 parts of salicylic acid requires two molecules, 648 parts of the citrate for perfect and permanent solution. This indicates that only half of the potassic radicle is replaced as represented by the following equation:

$$2(K_3Ci)+3(HSl)=3(KSl)+K_2HCi+KH_2Ci.$$

The two resulting acid citrates, either separately or conjointly, form an amorphous mass which greatly interferes with the crystallization of the intermingled salicylate. It is however readily distinguishable under the micro-polariscope. When the dry residue is flooded with sufficient water the crystals are better seen along the margins of the liquid.

POTASSIUM TARTRATE.

Salicylic acid and normal potassium tartrate react upon each other molecule for molecule, that is, in the proportion of 138 parts of the first and 235 parts of the second, according to the following:

$$K_2T+HSl=KSl+KHT.$$

After filtering off the precipitated acid tartrate the salicylate is obtained in a practically pure solution. Evaporated on a slide, the salt crystallizes mixed with an occasional rhomb of the acid tartrate. On flooding the slide with water the tartrate remains and becomes very conspicuous. It also polarizes, but incomparably less florid than the salicylate.

ROCHELLE SALT.

One molecule or 282 parts of sodio-potassic tartrate reacts with one molecule or 138 parts of salicylic acid. The product consists practically of precipitated acid potassic tartrate and a solution of sodium salicylate. The result is expressed by the equation:

$$KNaT+HSl=NaSl+KHT.$$

The solution dried on a slide gives a crystalline residue which, under the microscope, is shown to have a feathery appearance. In the smaller crystals there is a decided tendency to radial grouping. When the residue is flooded with water a due proportion of rhombic cream of tartar crystals remain and an occasional short prismatic needle of acid sodium tartrate is seen. The sodium salicylate soon attaches itself to these again, and whilst completely covering them wholly confuses itself. The salicylate polarizes finely as also does the acid sodium tartrate, but in much smaller degree. A solution of pure sodium salicylate yields chiefly feathery crystals arranged in numerous concentric rings. In each ring system the crystals are all confined to rings, but

radiate uniformly from the common center of the system. The Pharmacopœia states that sodium salicylate occurs in small crystalline plates. This is entirely wrong as there is not the slightest tendency to plated formation. Under insufficient powers of the microscope the rounded groups have such an appearance, but higher powers resolve them as already stated.

The writer believes that the descriptive paragraphs of the Pharmacopœia are a most valuable feature. It is, however, the writer's opinion that ocular demonstration is worth pages of definitions never so vividly realistic. Much energy and valuable space was devoted to the voluminous but comparatively useless tables in the Pharmacopœia. But it does appear that it would be entirely consonant with the purposes of the code to institute the most appropriate means of elevating its standards. It therefore seems that a profusion of well executed representations would be an admirable, most simple and yet highly effective supplement to the official pharmacognosy. Such an element would raise the microscope in pharmacy into conspicuous prominence. Furthermore, this feature, if appropriately immanent, would largely tend to develop the close scrutiny, cleanliness and care so essential in the business of pharmacy. There is no reason why every drug store should not be equipped with an effective microscope. The money annually paid for senseless luxuries would purchase every pharmacist a very serviceable instrument of this kind.

SODIUM ACETATE.

Sodium acetate is more definite and less changeable than the potassic salt. It therefore offers better opportunities in arriving at more decided conclusions. Aside from this, the result is analogous to that with potassium acetate, and the reaction is precisely similar, as follows:

$$3(NaAc)+2(HSl)=2(NaSl)+NaAc(HAc)_2.$$

The solution evaporated on a slide yields large but coarse radial groups which do not improve under the microscope.

SODIUM CITRATE.

Normal sodium citrate reacts with salicylic acid on the same principle as the potassium salt. Since, in this case also, but half rather than two-thirds of the base is replaced, the writer employed disodic citrate with a view to elucidate the general reaction. In this instance

two molecules of the citrate reacted with one molecule of the salicylic acid, according to the following equation :

$$2(Na_2HCi)+HSl=NaSl+Na_2HCi+NaH_2Ci.$$

It will be seen the extra molecule of disodic citrate is apparently superfluous as it reappears intact in the second member of the equation. It is nevertheless somehow essential to the result, as all the salicylic acid can only be dissolved by the whole amount. The solution leaves elegant crystals on the slide, which are simply magnificent under the microscope. They must be viewed with very low powers, owing to their unusual size. They now closely resemble the potassium salicylate, as formed from the acetate. They also lack the ringed arrangement.

SODIUM PHOSPHATE.

Salicylic acid reacts on disodic phosphate molecule for molecule according to the following equation :

$$Na_2HPO_4+HSl=NaSl+NaH_2PO_4.$$

The solution yields a dry residue in which the salicylate does not appear to advantage. It does not possess a particularly agreeable taste.

SODIUM PYROPHOSPHATE.

One molecule or 446 parts of sodium pyrophosphate dissolves two molecules or 276 parts of salicylic acid, and the reaction is indicated as follows :

$$Na_4P_2O_7+2(HSl)=2(NaSl)+Na_2H_2P_2O_7.$$

The product gives rather better results under the microscope than the phosphate mixture. It also has a more pleasant taste.

SODIUM BORATE.

Two molecules or 276 parts of salicylic acid are dissolved by one molecule or 382 parts of sodium pyroborate as shown by the following equation ;

$$Na_2B_4O_7+2(HSl)=2(NaSl)+H_2B_4O_7.$$

This result is rather remarkable. It differs from all the other cases in that the pyroboric acid is wholly replaced and thus set free. On evaporation, a pasty, transparent residue remains. Under the microscope no satisfactory view is obtained, as the salicylate is completely obscured by the amorphous and extremely soluble pyroboric acid. The solution has a very nauseous taste.

AMMONIUM CITRATE.

It is difficult to obtain a definite normal ammonium citrate, owing to the similar condition of the carbonates. Bicarbonate of ammonium gives the best result, but not wholly free from uncertainty. The result with salicylic acid is possibly analogous to that with the other monad citrates. The indications, however, point to the following reaction:

$$(NH_4)_3Ci + HSl = NH_4Sl + (NH_4)_2HCi.$$

The solution readily yields most splendid crystals of ammonium salicylate. They are so large and distinct that very low powers serve best to exhibit them. Their form is intermediate between that of the potassium salt, obtained from the acetate, and the sodium salt derived from the citrate. The solution has a palatable, sweetish acidulous taste.

All of these mixed salicylates crystallizing well are obtainable from either strong or weak solutions with equal ease. Those, however, crystallizing with difficulty, appear better from weak solutions. All the solutions are more or less tinted of a brown-yellow color. Those from the potassium tartrate and the borax have the deepest shade, whilst those from the sodium pyrophosphate and the ammonium citrate have the lightest.

The solutions resulting from borax and sodium phosphate are the most unpalatable, while those of ammonium citrate and Rochelle salt are the least so.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Testing of Potassium Iodide.—Dr. J. Mühe (*Phar. Centralh.*, 1885, p. 85) stated that pure potassium iodide is decomposed with the liberation of iodine by water containing carbonic acid gas, but Weppen and Lüders (*Ibid.*, p.129) obtained different results. On repeating the experiments, H. Beckurts and W. Freytag (*Ibid.*, p. 215–218) ascertained that a 5 per cent. solution of pure potassium iodide in previously boiled water is not decomposed by a stream of pure carbonic acid gas; but the liberation of free iodine was at once observed, if the solution was mixed with water, impregnated with carbonic acid gas and kept on hand for some time. The same carbonic acid water, deprived of most of the gas by prolonged exposure in a beaker, as well as distilled water which had been kept on hand for some time, at once

liberated iodine. The absence of nitrites and hydrogen peroxide had been previously ascertained. The authors explain this behavior by the gradual change of the CO_2 at first dissolved in the water, into H_2CO_3, and that the decomposition of the iodide is effected by hydrogen carbonate, but not by carbon dioxide. The importance of these observations in connection with the testing for nitrous acid by means of potassium iodide is obvious.

Chloride of iodine and bromide of iodine produce with starch paste a violet color, according to the observations of H. Beckurts and W. Freytag (*Phar. Centralh.*, 1886, p. 231); for if to the blue aqueous solution of iodine and starch, chlorine water or bromine water be carefully added, the blue color is changed to violet, and this is destroyed by an excess of the reagents named, the liquid becoming colorless or yellowish-red. If to a mixture of chlorine water or bromine water with starch solution, a solution of iodine be carefully added, a violet colored precipitate of iodine-chloride starch or iodine-bromide starch is produced, the color disappearing on the application of heat and reappearing again on cooling. The same violet color is produced on adding to potassium iodide a small quantity of chlorate or bromate, also starch solution and diluted sulphuric acid; the violet color often changes to blue, most likely through the decomposition of the iodine chloride with the liberated hydriodic acid, whereby hydrochloric acid and free iodine are produced.

Nitrates contaminated with Chlorate.—O. Schlickum observed that samples of saltpetre free from chloride, on being heated to fusion, would yield a solution causing a precipitate with silver nitrate. H. Beckurts (*Archiv d. Phar.*, April, 1886, p. 333) has made similar observations with both sodium and potassium nitrate, and attributes this reaction to the presence of minute quantities of chlorate or perchlorate. He found also that at least 0·25 per cent. of potassium chlorate must be added to pure potassium nitrate before the former can be detected by the decoloration of indigo solution in the presence of diluted sulphuric acid and a minute quantity of sulphurous acid; but after treating such mixtures with nascent hydrogen, the presence of chloride could be established.

Sal pepticus or Peptochloride of Sodium or Digestive Salt are names suggested by Dr. Prosser James (*Brit. Med. Jour.*, May 16) for a mixture of sodium chloride and pepsin, which has been found useful in cases of dyspepsia.

Brandy.—Ch. Ordonneau has found in 100 liters of pure brandy, prepared from wine and 25 years old, the following: Acetaldehyde 3, acetic ether 35, acetal 35, normal propyl alcohol 40, normal butyl alcohol 218·6, normal amyl alcohol 83·8, normal hexyl alcohol 0·6, normal heptyl alcohol 1·5, propionic, butyric and caprylic ethers 4, œnanthic ether about 4, and amine bases 4 gm.

Alcohol prepared from maize, beets or potatoes, contains isobutyl alcohol (but no normal butyl alcohol), propyl alcohol, amyl alcohol, pyridine, and probably collidine. No butyl alcohol is produced under the influence of beer-yeast (the globular form), while normal butyl alcohol is generated by wine-yeast (the elliptic form).—*Rep. Anal. Chem.*, 1886, p. 13.

Eau de Quinine is a mixture of rum 100 p., cologne spirit 10 p., castor oil 10 p., tincture of red cinchona 10 p., balsam of Peru 3 p., and water 50 parts.—*Südd. Apoth. Ztg.*

Solution of Caffeine for Hypodermic Injections.—Tanret recommends the following: Triturate caffeine 2·50 gm., with sodium benzoate 2·95 gm., add distilled water 10 ccm. and filter. Solution takes place very readily. The benzoate is preferable to the salicylate of sodium because the latter acquires a rose colored tint on coming in contact with mere traces of iron.—*Rép. de Phar.*, 1886, p. 119.

Menthiodol has been recommended in neuralgia. It is prepared by carefully heating 4 parts of menthol in a small glass or porcelain vessel, adding 1 part of finely powdered iodol, and triturating well until a homogeneous mass is produced, which is converted into cones or pencils of suitable size. Should the mass become too hard for certain purposes, it is remelted with the addition of a minute quantity of camphor.—*Rundschau, Prag,* 1886, p. 368.

Iodol Ointment is recommended by Trousseau (*L'Union Méd.*, May 22, 1886) to be made of iodol 2 gm. and soft paraffin 10 gm.

Iodol Lotion is prepared with iodol 3 gm., alcohol 32 gm. and glycerin 65 gm.

Tablets of Aconite are recommended by P. Vigier (*Gaz. Hebdom. Méd.*, April 16, 1886) as a convenient form for administering aconite, and to be made of tragacanth 0·5 gm., orange flower water 5·0 gm., sugar 50 gm. and tincture of aconite root (F. Cod.) 200 drops; to be divided into 100 tablets, of which five to ten may be taken in 24 hours. The French tincture of aconite root is precisely one-half the strength of that of the U. S. Pharmacopœia.

Linimentum Terebinthinæ was ordered by the British Pharmacopœia, 1867, to be made by triturating together soft soap 2 oz., camphor 1 oz., oil of turpentine 16 fluid ounces. The present Pharmacopœia orders the same quantities, but directs the soft soap to be first mixed with 2 fluid ounces of water. W. Baxter, Jr. (*Phar. Jour. and Trans.*, June 5, 1886), states that this mixture soon separates, the lower layer becoming a thick jelly, very difficult to shake up; but if the water is increased to 4 fluid ounces, a beautiful liquid white and permanent emulsion is obtained.

Anise Cones are made from spermaceti, wax and oil of anise, and are recommended against the bites of flies and other insects.

Indellible Ink.—Dissolve extract of logwood 240 gm. in sufficient distilled water, add yellow potassium chromate 15 gm., and chromate of copper 8 gm., evaporate to a thick consistence and mix with 15 gm. of varnish.—*Phar. Rundschau, Prag*, 1886, p. 3 5.

Antiseptic Paper has been introduced in the military hospital of Vincennes by Dr. Bedoin. Filtering or other absorbent paper is sterilized by heating it in a drying oven to 110° C., after which it is immersed in a solution of corrosive sublimate, boric acid, phenol or other antiseptic.

Antiseptic Mouth Wash.—Dr. Müller (*Deut. Med. Wochensch.*) recommends a solution made of thymol 0·25 gm., benzoic acid 3·00 gm., tincture of eucalyptus 15·00 gm. and water 750·00 gm., to be used as a wash to rinse the mouth after meals, and especially before going to bed. It will destroy bacteria and prevent caries of the teeth and foul breath.

Boric Acid has been found useful by Dr. A. D. Macgregor (*Brit. Med. Jour.*, July 10) in various diseased conditions of the mouth, and has been applied in the form of powder, confection and as a gargle combined with glycerin. A good antiseptic *tooth-powder* is made from boric acid 4, potassium chlorate 3, guaiacum resin 2, prepared chalk 6, and magnesium carbonate 33 parts.

Stannous Chloride may be used as a disinfectant, according to D. Abbott, instead of corrosive sublimate, because it is comparatively safe, does not corrode lead pipes, and is also cheap. A 1 per cent. solution kills spores after an exposure of two hours. It is considerably more active than zinc chloride, copper sulphate, zinc sulphate, and sulphate of iron. When intended to be kept for use, it should be mixed with an equal weight of ammonium chloride, which prevents the formation of the insoluble oxychloride of tin.—*Med. News*, Jan. 30, 1886.

GLEANINGS FROM FOREIGN JOURNALS.

By George H. Ochse, Ph.G.

Polishing Pomade.—The following formula is said to yield a good product: Oxalic acid 1 part, ferric oxide 25 parts, tripoli 20 parts, palm oil 60 parts, soft paraffin 4 parts.—*Rundschau*, 1886, p. 435.

A Cement which is not affected by boiling sulphuric acid is made by melting caoutchouc at a moderate heat and adding 3 per cent. of suet, stirring constantly, then adding a sufficient quantity of slaked lime to give it the consistency of soft dough; lastly 20 per cent. of red oxide of lead is added.—*Ibid.*, p. 435.

Syrup of Lactophosphate of Calcium and Iron.—According to Thyssen, syrup of lactophosphate of iron is first made as follows: Dissolve 5 parts of lactate of iron in 40 phosphoric acid, add simple syrup 160 parts, oleosaccharate of lemon 4 parts and simple syrup enough to make 1000 parts. To this syrup is added the syrup of lactophosphate of calcium made as follows: Calcium lactophosphate 3 parts, citric acid 1.2 parts, simple syrup to make 1200 parts; flavor with oil of lemon.—*Ibid.*, p. 517.

Billroth's Adhesive Iodoform Gauze is made by impregnating 200 meters of bleached organtin with the following solution: Glycerin 500 grams, colophony 1000 grams, alcohol 10 kilograms, iodoform, pulverized, 4 kilograms.—*Ibid.*, p. 405.

Bismuth Salicylate —Solger recommends salicylate of bismuth very highly in chronic catarrh of the bowels, also in the diarrhœa in the last stages of tuberculosis. In reflex neurosis, due to chronic intestinal affections, impotency and epileptic imbecility, due to the same cause, Solger obtained excellent results from its use. It is best administered in cachets, and is given in doses of 0·6 gram repeated every 3 hours.—*Ibid.*, p. 405.

Two New Reactions for Morphine.—1. If 1 milligram of powdered morphine is intimately mixed with 8 drops of concentrated sulphuric acid and a small particle of arseniate of potassium, and the whole is heated in a capsule (agitating constantly) until acid vapors are evolved a beautiful blue-violet color is produced; by continuing the heat the color changes to a dark-brown red. If water is cautiously added, a reddish color turning green when more water is added results. If the liquid is shaken with chloroform, a beautiful violet color is produced, if shaken with ether, a violet red color, the bottom layer turning brown.

2. If morphine is rubbed up with about 8 drops of concentrated sulphuric acid and a drop of a solution of chlorate of potassium 1 : 50, a persistent grass-green coloration, having a pale rose-red margin, is produced.—*Ibid.*, p. 580.

Pepsin.—Podwissotzki calls attention to the fact that fresh mucous membranes show very little pepsin, but a large quantity of propepsin; consequently a much larger yield can be obtained from membranes which have been exposed to the air and prevented from decomposing. To extract the pepsin, diluted hydrochloric acid or glycerin acidulated with hydrochloric acid is recommended. Alcohol extracts a very small percentage, glycerin extracts the propepsin, which must be treated with hydrochloric acid at ordinary temperature for from 2 to 10 minutes to be converted into pepsin.—*Ibid.*, p. 578.

Similar observations were made by Selldén in 1873, by Béchamp and Gautier in 1882, and by others.

THE MANUFACTURE OF CERESIN FROM OZOKERITE.[1]

By E. Sauerlandt.

In the showcase of a Belgian manufacturer of candles, at the Antwerp Exhibition, was to be seen a fragment of waxlike substance labelled "Ozokerite or Vegetable Wax." This fact shows how little is known, even by those most nearly interested, of an industry which, dating back only about fifteen years, has attained an annual value of upwards of half a million pounds sterling. The ignorance is no doubt due, mainly, to the paucity of information that has been published respecting the industry and the raw material used in it.

The first attempt at bleaching mineral wax known to the author dates from 1870. The first industrial results were obtained by H. Sljhely, of Stockerau, near Vienna, Dr. Pilz, of Carlsbad, and J. F. Otto, of Frankfort-upon-Oder; ceresin was introduced into the market by these different houses in the course of 1872.

During the last ten years a number of processes for the purification of ozokerite have been proposed, very few of which have been practically successful. At the present time scarcely more than two processes are employed, both of which are based upon the employment of sulphuric acid. In the more important establishments where mineral wax is refined, the ozokerite is heated in contact with sulphuric acid to

[1] Abstract from a paper in the *Chemiker Zeitung*, 1886, pp. 21 and 38.

a temperature of 180° C., and even higher, by which means an almost complete decomposition of the sulphuric acid and carbonization of the substances separated by it is effected. In some smaller factories where the operations are conducted at a much lower temperature, the acid, charged with the impurities, collects at the bottom of the vessel as a black tarry mass that is easily separated.

In whatever way the operation is conducted, it is necessary first to free the crude ozokerite, as delivered from the melters of Borislaw in Eastern Galicia, from the small quantity of water that it always contains; for which purpose it is dried by heating it to 130° C., at which temperature the water is entirely driven off. The mineral wax requires to be heated very slowly to avoid sudden ebullition of the melted mass, through the superheating of the water, and small pieces of the crude wax are thrown into it whenever it threatens to rise. In some cases this heating is effected in the same boilers as the heating with sulphuric acid; in others a special vessel is used which allows of the deposit of mechanically mixed impurities at the bottom. The vessels for the preliminary boiling, which should be of a capacity sufficient for a day's product, are heated either over a bare fire or are jacketed and heated by steam. In the former case the apparatus takes the form of an alembic, consisting of a hemispherical boiler with dome and cooling worm, in which any vapor of the light oil given off during the melting is condensed. When the heating is effected by steam, the small quantities of hydrocarbon carried away with the steam do not necessitate any arrangement for condensation.

In carrying out the first-mentioned method of bleaching, where the temperature is raised to 180° C., the mixture of the ozokerite with the sulphuric acid is effected either by means of an iron or copper stirrer worked by hand or by a mechanical agitator. Although the latter arrangement would appear in principle to be much the more rational of the two, it is not the most used, even in the larger manufactories, in consequence of practical difficulties that have not yet been satisfactorily overcome. After the earth-wax has been freed from water it is placed in the acidifying vessel with a mixture of vitriol and fuming sulphuric acid in proportions corresponding to the quality required; it is then gradually heated with constant stirring to 180° C., at which temperature the sulphuric acid is almost completely driven off. After neutralization of the last traces of acid and partial decolorization, the mixture is allowed to stand. The tolerably clear

layer of ceresin that forms at the top is drawn off and filtered through paper; the residue is pressed, whilst still in a warm pasty condition, in hydraulic presses, the runnings being also filtered through paper. As a result of these operations only about two-thirds of the ceresin present in the ozokerite is obtained, the other third being retained in the press residue. This is now generally recovered by extraction, petroleum benzin being the solvent used in most factories, and only here and there carbon bisulphide. The ceresin extracted is freed from traces of the solvent by passing superheated steam through it and then filtered. The entire yield by this method of operating amounts to 70 to 75 parts of white, or 80 to 85 parts yellow ceresin from 100 parts of ozokerite used.

According to the second method of working the dehydrated ozokerite is introduced into the mixing vessel in the melted condition at the lowest possible temperature, and then mixed by means of a mechanical stirrer or a current of dry air with exactly the quantity of sulphuric acid required to effect the reaction. After standing the top layer of dark colored but clear ceresin is drawn off into another vessel, where it is neutralized and decolorized and then filtered. The black tarry residue is neutralized and submitted to distillation, the distillate consisting of paraffin and mineral oils. This method has many disadvantages and is not largely followed. Both methods are, indeed, defective, since it is known that crude ozokerite can be made to yield 90 to 92 per cent. of a white bleached product, instead of the 70 to 75 per cent. usually obtained in manufactories.

The filtered ceresin, if intended for yellow goods, is brought up to the right tint by means of gamboge, turmeric, dragon's blood, or one of the various aniline colors soluble in fats, and then poured into moulds to cool. The "half white" and "white" ceresin is stirred continually while cooling to prevent crystallization, and it is not until it has solidified to a pasty consistence that it is poured into the moulds. In this way a whiter appearance in reflected light is produced.

White ceresin is frequently mixed by the manufacturers with the lower-priced paraffin and the yellow ceresin with resin. The addition of paraffin cannot be detected either by chemical tests or determination of the specific gravity. It is, however, hardly to be deemed an adulteration since in some cases, as for illuminating purposes, its presence is advantageous. The addition of resin ought, however, to

be deemed an adulteration. For its determination the suspected ceresin should be dissolved in hot alcohol, and the mixture then cooled and filtered. The ceresin being almost insoluble in cold alcohol is removed, and any resin present will be found in the residue upon evaporation of the filtrate.—*Phar. Jour. and Trans.*, July 31, p. 90.

ON THE SAPONIFICATION-EQUIVALENTS OF FIXED OILS.

By Alfred H. Allen, F.I.C., F.C.S.

Read before the Society of Public Analysts, June, 1886.

The saponification-method of examining fatty oils, originally applied by Kœttstorfer to the examination of butter, has been employed by various chemists for differentiating other oils, and has proved one of the most valuable methods of analysis yet devised.

The practical value of the indications of Kœttstorfer's process largely depends on the accumulation of evidence as to the limits of variation of neutralizing powers exhibited by different samples of oil of the same kind, and hence I have been at some trouble to collect data on the subject. These data are given in the following table, which contains results obtained by Kœttstorfer (K), F. W. and A. F. Stoddart (S), L. Archbutt (LA), E. Valenta (V), R. Moore (M), Hübl (Hl), O. Hehner (H), W. H. Deering (D), the author (A), and others. In many instances the figures are the average or extreme results yielded by the examination of a large number of samples, the determinations made in my own laboratory numbering many hundreds. Still, a further experience will doubtless show that the limits stated in the table in many instances require modification.

The table gives, in most cases, the number of samples on which the figures are based, together with the percentage of caustic potash required for saponification, and the "saponification-equivalent" corresponding thereto. This last value is found by dividing the percentage of KHO required to saponify the oil into 5610. It represents the number of grammes of an oil which would be saponified by one liter of a normal solution of any alkali. In the case of the glycerides, the saponification-equivalent is one-third of the molecular weight, but in the case of monatomic ethers, like those which essentially constitute sperm oil and beeswax, the saponification-equivalent is identical with the molecular weight.

Nature of Oil.	Initial of Observer.	No. of Samples.	Percentage of KHO for Saponification.	Saponification Equivalent.
A. OLEINS—				
Lard oil	S.	...	19·1 to 19·6	285 to 296
Olive oil	K., S., V.	30	19·1 to 19·6	
Olive oil	LA.	40	18 93 to 19·26	
Almond oil (sweet)	V	12	19·47 to 19·61	
Arachis oil	V., M.	2	19·13 to 19·66	
Tea oil	Davies.	1	19 55	
Sesamé oil	V., M., A.	3	19·00 to 19·24	
Cottonseed oil	S., D., V., M., A.	8	19 10 to 19·66	
B. RAPE OIL CLASS—				
Colza and Rape oils	K., D., S.	8	17·08 to 17·90	313 to 330
Rape oil	LA.	44	17 02 to 17·64	
Mustardseed oil	V., A.	2	17 4 to 17·5	
Cabbageseed oil	Davies.	1	17·52	
C. VEGETABLE DRYING OILS—				
Linseed oil	S., D., M., LA.	9	18·74 to 19·52	286 to 300
Poppyseed oil	V., M.	2	19·28 to 19·46	
Hempseed oil	V.	1	19·31	
Walnut oil	V.	1	19 60	
Nigerseed oil	S.	2	18·9 to 19·1	
D. MARINE OLEINS—				
Codliver oil	A., V.	2	18·51 to 21·32	250 to 303
Menhaden oil	A.	1	19·20	
Pilchard oil	S.	...	18 6 to 18·75	
Seal oil	S., D.	4	18·9 to 19·6	
Southern whale oil	D.	1	19·31	
Northern whale oil	S., A.	4	18·85 to 22.44	
Porpoise oil	A.	2	21·60 to 21·88	
E. BUTTER CLASS—				
Butter fat	K., V., M., A.	large	22·15 to 23·24	241 to 253
Cocoanut oil	V., M.	5	24·62 to 26 84	209 to 255
Palmnut oil	V.	1	22·00 to 24 76	
F. STEARINS, &c.—				
Lard	K., V. A.	7	19·20 to 19·65	277 to 294
Tallow	K., D.	9	19·32 to 19 80	
Dripping	K.	2	19·65 to 19·70	
Butterine	M., A.	large	19·35 to 19·65	
Goose fat	V.	1	19·26	
Bone fat	V., LA.	2	19·09 to 19·71	
Palm oil	M., V.	3	19·63 to 20·25	
Cacao Butter	V.	1	19 98	
G. FLUID WAXES—				
Sperm oil	S., D., A.	10	12·34 to 14·74	380 to 454
Bottlenose oil	A., LA., D.	5	12·30 to 13·40	419 to 456
H. SOLID WAXES—				
Spermaceti	H.	3	12·73 to 13·04	432 to 441
Beeswax	H., Hl., A.	large	9.2 to 9·7	
Carnauba wax	Hl., V., H., LA.	4	7·90 to 8·51	
Chinese wax	A.	1	6·5	
I. UNCLASSED—				
Shark-liver oil	A.	8	14·00 to 19·76	284 to 400
Wool fat (suint)	V.	1	17·00	330
Lanolin	A.	1	9·83	570·9
Olive-kernel oil	V.	1	18·85	298
Castor oil	S., D., A., V.	6	17·60 to 18·15	309 to 319
Japanese wood oil	Davies.	1	21·1	266
Japan wax	H., Hl., V., A.	8	21·01 to 22·25	252 to 267
Myrtle wax	D., A.	2	20 57 to 21·17	265 to 273
Blown rape oil	LA., A.	3	19·8 to 20·4	275 to 284
Colophony	H., A., D.	4	17·0 to 19·3	290 to 330

On inspecting the results recorded in the foregoing table, it appears that the oils of Group A, consisting of olein with comparatively little stearin or palmitin, neutralize appreciably equal quantities of potash, and that whether of animal (like lard oil) or vegetable origin (*e. g.*, olive and almond oils). On the other hand, the oils of Group B, all of which are derived from cruciferous plants, neutralize sensibly less alkali than those of Group A, a fact which is explained by the presence of a considerable proportion of brassic acid, or other higher homologues of oleic acid, in rape oil and its allies. In the case of the drying oils, the saponification-equivalents are not characteristic, but they point to the probability of linoleic acid having a higher atomic weight than that commonly attributed to it. This suggestion receives support from a variety of facts which have passed under my notice, and I hope to refer to it more at length on a future occasion. The marine animal oils, Group D, do not yield very characteristic results, except in contrast with the figures of Group G, the oils of which are not glycerides, but consist essentially of ethers of monatomic alcohols. Porpoise oil is remarkable for the notable proportion of valerin contained in it, and hence for its comparatively high neutralizing power. Valeric acid is also the characteristic volatile fatty acid of the butter from porpoise milk. The glyceride of valeric acid also exists to a considerable extent in whale oil, blackfish oil, and dolphin oil. Chevreul obtained from the last named oil as much as 20·9 per cent. of valeric acid.

Of the solid fats, those of Group E resemble porpoise oil in containing glycerides of lower fatty acids, and hence possess lower saponification-equivalents than the oils of Group F, which consist essentially of variable mixtures of palmitin, stearin, and olein. Japan wax also contains a notable proportion of lower fatty acids. A sample examined by Hehner's butter method gave 88·4 per cent. of insoluble acids and 8·4 per cent. of soluble acids, calculated as $C_8 H_{16} O_2$.

The saponification-equivalent of rape oil is very sensiby reduced by oxidation or "blowing," a fact which is probably due to the formation of lower fatty acids, but the changes produced in oils by oxidation much need further investigation by the aid of recent methods of analysis.—*The Analyst*, 1886, p. 145.

Caffeine in hypodermic injections of $\frac{1}{6}$ or $\frac{1}{4}$ grain has been found by Dr. Castle (*Cinc. Lancet and Clinic*) to successfully relieve neuralgia.

SOAP AS A HYGIENIC MATERIAL.

By Oscar Liebreich, M.D.

The general conception has heretofore been that the secretion collecting on the surface of the skin, "die Hautschmiere," originates in the sweat and also in the sebaceous glands, and that the mixture of dried sweat and sebum covers the skin as "uncleanness." I have shown, however, in my investigation with lanolin that the secretion of cholesterin fat, hitherto unknown in the human organism, takes place direct from the tissues containing keratin. The epidermis and also the epidermis of the hair can directly secrete fatty material. According to the earlier views, it was assumed that no formation of fat took place in the epidermis. One imagined the keratin structures, epidermis, hair, nails as properly only consisting of resisting keratin. We now know that to the tissue itself fat comes which is not prepared by the glands, but which is formed within the tissue itself. That under pathological conditions an excessive secretion of the sebaceous glands takes place has been proved by Dr. Lassar.

The secretion may, moreover, attain very considerable dimensions —*e. g.*, in the case of wool. In the spines of the hedge-hog the epidermis excretes a considerable quantity of fat, whilst the sebaceous follicles belonging to them are starved.

How large the amount of fatty contents of the horny tissues may be up to the present nothing definite is known. Apparently there may be great oscillations. But the important point in respect of hygiene is the fact that cholesterin or some analogous fat is always present in the horny tissues, although often in small quantities.

In the question of cleansing of the skin in a hygienic sense, the above described condition of the skin is to me naturally of the greatest significance. The skin should undergo cleansing without the chemical, and still more the physiological, properties suffering any change thereby. The skin should remain intact. If it were simply a matter of cleansing a keratin covering of the products that are deposited on it, the use of rather sharp cleansing material would not so much matter; the surface might be slightly cauterized without injury to the lower layers. But if we make use of sharp material the fat is withdrawn from the horny tissue of the hair, the epidermis; the epidermis is destroyed—at any rate, rendered more absorbent; and the lower layers, the stratum lucidum and granulosum, and farther in the cells, are given up to destructive action.

I believe no better example can be given how carefully and delicately the surface only of the horny tissue must be cleansed than to call to mind the processes that are gone through in a wool-cleansing establishment. Here the wool is to be freed from the natural cholesterin fat. The aim of the cleansing is to remove the fat carefully from the hair without attacking the substance of the hair. Even with the employment of soda, one has to proceed with the utmost caution, as the wool is easily rendered brittle, the wool cannot then be spun.

In the process of washing, then, only that fat is to be removed that is on the surface of the wool hairs. Free alkali or other sharp chemical substances extract the fat from the keratin tissues, and without it the wool becomes brittle, and therefore unusable. If we keep this point in view from the very commencement, all extracting material are to be rejected, such as ether and sulphide of carbon, that indeed extract more fat, but which completely lixiviate the horny tissue.

The cleansing of the skin is to be considered in an exactly similar manner. We wish to remove the impurities that are deposited on the skin without attacking the epidermis, and above all the fat contained in the epidermis must not be removed. For this purpose, above all things, a neutral soap is required. There should be no question of dissolving the secretions present on the skin. Soap acts only as an emulsifying agent. It is an old experience that when tar has to be removed from the skin the tarry spot is to be rubbed with fat, because then the soap acts as a better emulsifyer on the tar.

Soap should be perfectly neutral, and free from foreign substances or "complementary" material. I would certainly reject the various kinds of soap in general use, as hygienic toilet articles; the only reliable kinds of neutral soap fit for toilet use are those manufactured in accordance with the method published in the *Berichte des Vereins für Gewerbfleiss*, Nov. 3, 1884, in which the impurities and excess of alkali are got rid of by a twice-repeated centrifugal process. For the purpose of securing an excess of fat in the soap, I recommend the addition of lanolin.—Abstract from *The Medical Press.*

Hydrochlorate of Caffeine has been observed by Dr. Terrier to possess an anæsthetic action almost identical with that of cocaine.—*Jour. de. méd. de Paris.*

DIASTATIC ACTION OF SALIVA.

By R. H. Chittenden and H. E. Smith.

For the purpose of testing the diastatic action of saliva quantitatively, a 1 or 2 per cent. solution of starch was exposed to the action of saliva at 40° C. for half an hour, and the reducing substances formed were in all cases calculated as dextrose by Allihn's (*Zeit. anal. Chem.* xxii, 248) method. The action of a ferment is not proportional to its amount until its solution is much diluted; when the dilution of the saliva is as 1 : 50 or 100, the diastatic action can be taken as a measure of the amounts of ferment present. The normal alkalinity of 15 samples of saliva reckoned in terms of sodium carbonate was 0·097 per cent. When this is neutralized with 0·2 per cent. hydrochloric acid, its diastatic action is much increased, especially when the dilution is 1 : 50 or 100; but the difference is still pronounced when the dilution reaches 1 : 2000. There appears, however, to be no proportional relation between natural variations of alkalinity and diastatic action, although the addition of sodium carbonate to neutral saliva retards and finally stops the action of ptyalin in proportion to the amount added; this occurring especially readily in more dilute solutions. This is not due to simple dilution, but to the thereby diminished percentage of proteïd matter, which in the less diluted saliva possibly combines with the carbonate; and such proteïd compounds have no effect on the ferment. Neutral peptone, on the contrary, has a distinctly stimulating effect on the activity of neutral saliva; and when proportionate amounts of peptone and sodium carbonate are added, the destructive action of the latter is prevented, an alkaline proteïd substance being probably formed. The influence of free acid and of acid proteïd on the activity of ptyalin is important, in view of the rapid passage of the salivary secretions into the stomach. That gastric juice does destroy ptyalin has been shown by Langley (*J. Physiol.*, iii); the present research was directed to determining quantitatively the particulars of such action; the tropæolin test being used for the detection of free acid. As a mean of eight determinations, 20 c.c. of neutralized saliva were found to contain proteïds capable of combining with 7·74 c.c. of 0·1 per cent. hydrochloric acid, a result showing on comparison with similar experiments with peptones, either that the combining power for acid of saliva proteïd and peptone is different, or that much acid is used up in reacting with

the alkaline phosphates present in saliva. When the proteïd matter present is saturated with acid, the saliva has greater diastatic power than when it is simply neutralized. Small percentages of acid peptone act similarly, but beyond a certain point (when the amount of combined acid is over 0·006 per cent.), acid proteïds retard and finally destroy the action of the ferment. A minute trace of free acid in dilute saliva still further increases diastatic activity, but 0·003 per cent. of free hydrochloric acid stops it.—*Jour. Chem. Soc.*, July, 1886, p. 638; *Chem. News*, vol. 53.

NATURE OF PAPAÏN AND ITS ACTION ON VEGETABLE PROTEÏD.

By S. H. C. Martin.

The ferment in papaw juice is associated with an albumose, and to the reactions previously stated by Wurtz, the following are added: the solution gives a biuret reaction, and it is precipitated from a neutral solution by sodium magnesium sulphate, the precipitate still being active. It is not precipitated by magnesium sulphate or sodium chloride alone, as globulins are. It is soluble in glycerol, and if precipitated from this solution by alcohol, the filtrate has no proteolytic power. The kind of albumose is one nearly akin to the protalbumose of Kühne and Chittenden, and is called *a*-phytalbumose. Papaw juice also contains a milk-curdling ferment.

The proteïds present in papaw juice were found to be as follows: 1. Globulin, resembling serum globulin in its most important properties. 2. Albumin. 3. *β*-Phytalbumose precipitated almost completely by heat, by saturation with neutral salts, but not by dialysis. It differs from the heteroalbumose of Kühne and Chittenden, by not being precipitated by dialysis, by copper sulphate or by mercuric chloride. 4. *a*-Phytalbumose; soluble in cold or boiling water; not precipitated by saturation with neutral salts, except in an acid solution. This is the vegetable peptone referred to by Vines (*J. Physiol.*, iii) as hemialbumose. It differs from the protalbumose of Kühne and Chittenden by its non-precipitation by sodium chloride or by copper sulphate. Both these albumoses give the biuret reaction. No peptones occur in the juice, but leucine and tyrosine are present.

By a series of digestion experiments carried out on each of these proteïds by papaïn in a neutral liquid, it was found that both the

globulin and albumin are changed into β-phytalbumose, and that this becomes a peptone-like substance, and forms leucine and tyrosine. The α-phytalbumose becomes a similar peptone-like substance, leucine and tyrosine being formed. This peptone-like substance resembles the deuteroalbumose of Kühne and Chittenden, except that a solution of it when rendered acid by acetic acid in the presence of sodium chloride does not become cloudy on warming. No true peptones are formed.

Probably digestion in the plant itself is very slow, as much more liquid was used in the experiments than is present in the juice. The albumose forms probably the circulating proteïd in the plant.—*Jour. Chem. Soc.*, July, 1886, p. 642; *Jour. Physiol.*, vi. 336–360.

FORMALDEHYDE AND ITS CONDENSATION.

By O. Loew.

Formaldehyde is conveniently prepared in the following way: A current of dry air is drawn as quickly as possible through a half liter flask, half filled with methyl alcohol, then through a hard glass tube 30 cm. long, containing a cylinder of coarse copper gauze 5 cm. long, and then successively through an empty flask (300–400 c.c. capacity), and two flasks half filled with water. That part of the tube containing the copper gauze is surrounded with brass gauze and gently heated. When the alcohol vapor reaches the copper, the latter glows more or less, according to the rate of the current of air passing over it. The operation requires no attention beyond keeping up the supply of alcohol, and may be left night and day. A 15–20 per cent. solution of aldehyde was obtained in this way.

In like manner, ethers, hydrocarbons and even bases can be converted into aldehydes.

Formose, $C_6H_{12}O_6$, is obtained by shaking a 3·5 to 4 per cent. solution of formaldehyde with an excess of milk of lime; after half an hour, the liquid is filtered, and nearly or quite saturated with lime. In 5 to 6 days, the odor of formaldehyde disappears, and a drop of the liquid shows a very great reducing power with Fehling's solution. The whole is then neutralized with oxalic acid, the filtrate evaporated to a syrup, mixed with an equal volume of strong alcohol and warmed for some hours, when the greater part of the calcium formate separates. The filtrate is evaporated at a moderate temperature to a thick

syrup, dissolved in alcohol and treated with ether, which precipitates the sugar as a tenacious mass. The crude product was purified by partial precipitation. When dried at 90°, it forms a gum-like mass, and could not be obtained in the crystalline form. It has an intensely sweet taste, like that of cane-sugar syrup, which it generally resembles in its behavior, as for instance towards phenylhydrazine. It is sparingly soluble in alcohol, insoluble in ether. When heated at 119–120°, it gives up the elements of water, and yields a compound of the formula $C_6H_{10}O_5$, having an intensely bitter taste. Formose gradually loses its reducing power for Fehling's solution, when digested with a 2 per cent. solution of sulphuric acid; warm strong hydrochloric acid decomposes it with formation of humous substances. It is more readily decomposed by alkalis than dextrose. It reduces an alkaline solution of potassium ferricyanide to ferrocyanide, and precipitates metals, such as gold, palladium, etc., from solutions of their salts. Like dextrose and levulose, it gives a red coloration when warmed with an alkaline picric acid solution; it also decolorizes a solution of sodium sulphindigotate in presence of sodium carbonate. Other color reactions are described. Formose is quickly acted on by bromine, yielding oxalic and trihydroxybutyric acids. The action of nitric acid and of nascent hydrogen was also tried, but without any very definite results.

Yeast was found to have no action on formose carefully freed from formic acid. When a 5 per cent. solution is kept for three weeks with 5 c.c. of hay water, 1 per cent. of peptone, precipitated calcium carbonate, and 0·1 per cent. of hydrogen dipotassium phosphate at the ordinary temperature, a small quantity of lactic and less succinic acid are formed. Mould spores act on formose with separation of a substance, which rotated polarized light 5° to the right.

Compounds of formose with *baryta*, *sodium chloride*, *etc.*, were prepared. The *phenyldrazine-compound*, $C_{18}H_{22}N_4O_3$, formed by the union of phenylhydrazine (2 mols.) and formose (1 mol.) with elimination of 3 mols. OH_2, is described. Formose resembles the glucoses and differs essentially from Carius' phenose (*Annalen*, cxxxvi, 324), which is possibly an aromatic compound.

The substance obtained by Butlerow by the addition of lime-water to a boiling solution of "trihydroxymethylene," and described by him as methylenitan with the provisional formula $C_7H_{14}O_6$, is also formed by the action of lime at 70–90° on formose; it is a mixture consist-

ing chiefly of the saccharin of formose, $C_6H_{10}O_5$, already prepared and described by Tollens in 1884.

The condensation of formaldehyde to a sugar nearly related to the glucoses affords fresh evidence in support of v. Baeyer's theory of assimilation in plants. Attempts have been made to show that formaldehyde is an intermediate product between carbonic anhydride and dextrose, but without any definite results. The author, therefore, intends to investigate the external effect of formaldehyde on plants, and to ascertain whether starch is produced. The paper concludes with further remarks on the relation of formaldehyde to vegetable physiology.—*Jour. Chem. Soc., July*, 1886, p. 609. *J. pr. Chem.*, 321–351.

TWO NEW TESTS FOR SUGAR.[1]

The two reactions about to be described are common to cane-sugar, milk-sugar, glucose, levulose, and maltose, and to the carbohydrates and glucosides capable of yielding glucose by the action of sulphuric acid. They do not, however, produce any result with inosite, mannite, or quercite.

1. From one-half to two cubic centimetres of the suspected liquid are treated with two drops of a fifteen or twenty per cent. alcoholic solution of alpha-naphthol, and the mixture is shaken. A slight turbidity results from the precipitation of a little naphthol; sulphuric acid is then added in quantity equal to or even double the volume of the fluid, and the whole is briskly shaken. In the presence of sugar a deep violet color is developed, and dilution with water throws down a violet-blue precipitate, soluble in alcohol and ether with a yellow color, or in caustic potash with a golden-yellow color. In order that the reaction may occur as described, the test must be made exactly as stated.

This test will permit the detection of 0·00001 per cent. of sugar, and, with the exception of vanillin, anethol, methyl salicylate, and a few similar substances, gives no reaction when sugar is not present. These substances, however, either produce the color with sulphuric acid alone, or the precipitate formed when the violet solution is di-

[1] From a communication to the "Kaiserliche Akademie der Wissenschaften," Vienna.

luted with water, differs totally in character from that formed in saccharine liquids. The limit of sensibility of Fehling's test is 0·0008 per cent., and that of Trommer's test is 0·0025 per cent.

2. If, instead of the alpha-naphthol in the preceding test, an alcoholic solution of thymol of similar concentration be employed, the remaining manipulations being the same as before, a deep red varying from cinnabar to carmine is produced; dilution with water brings the color to carmine, and after a time there separates a flocculent precipitate, which dissolves with a pale-yellow color in alcohol, ether, and caustic potash, but with a bright yellow in ammonia.

The delicacy of this reaction is about the same as of that with alpha-naphthol.

After many experiments had shown the trustworthiness of the results given by these tests, it was interesting, on account of their exceeding delicacy, to apply them to the solution of the disputed question whether normal human urine does or does not contain sugar. The results of the first attempts were so decided that the urine examined appeared to be diabetic. The urine of a number of perfectly healthy individuals was therefore examined, but with precisely the same results. The tests were made with alcoholic solutions of alpha-naphthol and thymol, exactly as has been described, and the extraordinary delicacy of the reactions can be better understood by the statement that normal urine diluted to from one hundred to three hundred times its volume with water still gives a recognizable reaction. When the urine is diluted to four hundred times its volume, the test shows no result.

In order that there might be no question as to sugar being the actual cause of the reaction, the following substances were examined and gave negative results with both alpha-naphthol and thymol: urea, creatine, xanthine, uric acid, allantoine, hippuric acid, succinic acid, phenol, pyrocatechin and indican.

These results fully confirm the opinion advanced by Brücke, and supported by many other observers, that normal urine constantly contains sugar.

These tests may be applied in two different manners in order to distinguish a normal from a diabetic urine.

1. A specimen of normal urine and of that to be tested are equally diluted with water to about one hundred times their volume; the same quantity of each is then tested just as has been described; if

the suspected urine give a deeper violet than the normal specimen, it may be considered as diabetic.

2. The urine under examination is diluted with water to from four to six hundred times its volume. Even in this enormous dilution diabetic urine will sharply respond to the reactions of the tests described, while normal urine would give no result when diluted to four hundred times its volume.

After carefully studying the various tests for sugar in urine, F. Penzoldt came to the conclusion that the fermentation test is worthy of the greatest confidence in doubtful cases. All experiments, however, seem to show that the two new tests are decidedly more certain than the fermentation test. They leave but one thing to desire: they do not enable a distinction to be made between glucose and levulose, and although the sugar found in urine will in nearly all cases be glucose, yet various instances have occurred in which levulose was detected also.—*Phila. Med. Times*, Aug. 7, 1886; *Monatshefte für Chemie.*

TROPICAL FRUITS.[1]

By D. Morris,
Assistant-Director, Royal Gardens, Kew.

Amongst objects of productive industry receiving attention at present in our colonial possessions, tropical fruits are at once the newest and most interesting of all. Many of these fruits are practically unknown in England in a fresh state, and hence before tropical fruits are largely consumed here, it is necessary to diffuse knowledge respecting them, and to render them as familiar to English home people as they are to their colonial friends.

At the present Exhibition, owing to the suggestion of the Council of the Royal Horticultural Society, fresh fruits are shown from nearly every part of the British Empire. Thanks to the Colonial Market established in connection with the Exhibition, oranges, lemons and grapes are shown from the Australian Colonies; oranges of several kinds from Natal, fresh cocoa-nuts from the west coast of Africa, pine-apples from Antigua, bananas from Jamaica, naseberries (*Achras sapota*), Avocado pears, papaws, bread-fruit and limes from British

[1] Abstract of a paper read at a Conference held at the Colonial and Indian Exhibition. Mr. W. T. Thiselton Dyer, F.R.S., C.M.G., in the chair. From the *Gardeners' Chronicle*, July 24.

Guiana; melons from Barbadoes, prickly pears and dates from British India, and most luscious pine-apples from Singapore.

Although not exclusively a tropical fruit, the orange is found and flourishes throughout the eastern and western Tropics. Taking this fruit as an example, it is remarkable what a large increase has taken place in the consumption of this fruit in the United Kingdom during the last fifteen years. In 1870, the number of oranges imported into the United Kingdom was 80,000,000. In 1885 this number had increased to 500,000,000, or at the rate of fourteen per head of population. Dates are consumed to the extent of 5000 tons per annum, while cocoa-nuts are imported by the shipload.

Being the nearest to England, as well as the most productive in the way of tropical fruits, the West Indian Islands naturally supply, and should supply, the English market more readily than any other. At the present day in the West Indian Islands the value of the fruit exported is nearly £400,000 per annum.

In Jamaica alone fruit is annually exported to the value of over a quarter of a million sterling—consisting chiefly of bananas, oranges, pine-apples and cocoa-nuts. The Bahamas export chiefly pine-apples, both fresh and canned, to the value of £50,000 per annum. Trinidad grows and exports chiefly cocoa-nuts. British Honduras, connected by a mail route with New Orleans, exports bananas, cocoa-nuts and plantains to the value of £15,000 per annum. Montserrat is chiefly interested in limes, and exports limes and lime-juice to the annual value of £11,000. Dominica exports limes, tamarinds and concentrated lime-juice to the value of £4000; while flat and sugary Antigua exports only pine-apples, but those, though small, of very superior quality. From their geographical position it is only natural to suppose that a large proportion of the fruit of the West Indian Islands finds its way to the United States and Canada, where there are nearly fifty millions of people, with all of whom fruit enters largely into their daily food.

The banana (*Musa sapientum*) is the chief fruit at present cultivated in the West Indies, and this fruit is the one which in the future will be more largely offered in the English market than any other. There are numerous varieties of this fruit under cultivation; the Martinique banana is found the most profitable to grow for export, although a smaller fruit, known as the fig banana, is more luscious and more highly esteemed locally as a dessert fruit. Jamaica exports bananas to

the value of nearly £200,000 per annum, and is capable of growing fully three times the quantity now exported without any diminution in the larger staples.

The pine-apple (*Ananas sativa*) is no doubt indigenous in Jamaica, where an inferior kind, known as the "Cowboy macca," is still found wild. The pine-apple is incorporated in the arms of Jamaica, and certainly nowhere, except perhaps at Pernambuco, can pine-apples of such size and delicacy be grown as in some parts of this island. Antigua is noted for its pine-apples; the pitch-lake pine of Trinidad has at least a local reputation; but the Bahamas export more pine-apples in the fresh and cured state than any other part of the world. The chief supply of pine-apples for the English market at present comes from Madeira, the Canary Islands and the Azores. Should the interesting experiments now being carried on by Messrs. Scrutton and Sons, who have fitted up one of their ships with a refrigerating chamber, be successful, we shall before long have large supplies of pine-apples direct from the West Indies, and at a very moderate cost.

The West Indian lime (*Citrus medica, var. acida*) is a fruit which is not much known in England. It is possibly little grown anywhere else except in the West Indies, where a large industry is arising in connection with the preparation of raw and concentrated lime-juice for the manufacture of citric acid.

The mango (*Mangifera indica*) is the "apple" of the Tropics, and is a most nutritious and wholesome food as well as a dessert fruit Originally an East Indian tree, the mango has become thoroughly naturalized in the West Indies, and is forming large groves in waste places in Jamaica, where negroes, horses, pigs and fowls feed upon the fruits for nearly four months of the year. The West has given to the East the Anona fruits, known as sour-sop (*A. muricata*), the custard apple (*A. reticulata*), sweet-sop (*A. squamosa*), and the cherimoyer (*A. Cherimolia*), but practically only the second and third appear to have become established in the new home. The guava fruits (*Psidium Guayava*) are very common everywhere, and utilized chiefly for making the well-known guava jelly, and for flavoring cordials and syrups. The litchi, rambutan and longan of the East Indies are co-related by the genip (*Melicocca bijuga*) of the West Indies, all of which belong to the Sapindaceæ. The fruit of the spine-armed *Zizyphus Jujuba*, allied to the "seductive sweet fruit," the lotus of the ancient Lotophagi, has become cosmopolitan in its distribution,

and will soon find its way to England from the West as well as from the East. The passion-fruits are amongst the most delicate and refreshing of tropical fruits, and some of them have been successfully introduced to England. The most common are the granadilla (*Passiflora quadrangularis*), the pomme d'or or water lemon (*P. laurifolia*), the sweet-cup (*P. edulis*) and the calabash sweet-cup (*P. maliformis*).

Of tropical fruits known generally as nuts, we have a long list, some of which are seldom seen in England. The cocoa-nut is too well known to need description. It is computed that over three million acres of land are under cultivation in cocoa-nuts in tropical countries, and the annual export value of nuts, oil, copra and coir is estimated at nearly two million and a quarter pounds sterling. The Brazil nut (*Bertholletia excelsa*) is obtained entirely from wild trees which are of immense size; and the same may be said of the Sapucaya nut (*Lecythis Sapucajo*), and the Souari or butter-nut (*Caryoca nuciferum*).

India is so badly off for fruit herself, that she is not likely to be able to export any to this country; but the wild apricot of the Himalayas, of the Punjaub and North West Provinces, is produced in such immense quantities, and so easily cured by simply drying in the sun, that it might be imported at a very low price. It is the *Prunus armeniaca* of botanists, known in India as the mish-mush or Moon of the Faithful. This latter appellation it has obtained from the fact that it is sometimes pressed out into sheets or "moons" and kept in that state until required for use. The delicious fruits of Singapore and the Malay peninsula, amongst which the mangosteen and the durian are the best known, are not likely to come direct from those countries. The former has, however, been fruited both in Trinidad and Jamaica, and large trees of the latter exist at these islands, as well as at Dominica, Grenada and St. Vincent. Hence, West Indian mangosteens and durians are objects not impossible to be seen in England during the next decade.—*Phar. Jour. and Trans.*, July, 31, p. 88.

Aniline.—Dr Govan, of Rockland County, stated at the New York Medical Association that he had used aniline oil for the purpose of producing local anæsthesia when laying open felons and performing other minor operations. There was absolutely no pain, even when cutting down to the bone, when the finger had first been dipped for a short time in the oil.—*Cinci. Lancet and Clinic*, June 26, 1886.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Cortex adstringens Brasiliensis is the bark of Stryphnodendron Barbatimao, *Martius*, one of the Brazilian mimoseæ. This bark, which had been kept for a prolonged period, was examined by V. Wilbuszewitcz (*Phar. Zeitsch. f. Russland*, 1886; reprint), who obtained comparatively much phlobaphene and little tannin, the latter being obtained by the process of J. Löwe, by precipitating with sodium chloride, redissolving in water and agitating with acetic acid. By dialysis a small quantity of gallic acid was obtained. The phlobaphene is readily soluble in ammoniacal water, nearly insoluble in cold water, and is not precipitated by gelatin. Three tannins, differing in composition, one of them being slightly soluble in cold water, were obtained; their reactions were similar: brown black with ferric salts; light brown with copper acetate; red brown with copper sulphate; yellow with lead acetate; blue green with ammonium vanadate; tartar emetic, no precipitate, etc. 1 gm. potassium permanganate oxidized 1·329 gm. of one tannin, and 1·305 gm. of another variety. Decomposed with potassa, protocatechuic acid was obtained, but phloroglucin could not be observed. On heating with diluted sulphuric acid in a sealed tube, the tannin was decomposed, yielding phlobaphene, gallic acid and traces of ellagic acid, but no sugar.

Bablah is the fruit of Acacia Bambolah, *Roxburgh*, indigenous to India. V. Wilbuszewitcz (*Phar. Ztsch. Russl.*, 1886; reprint) estimated the tannin present with potassium permanganate, which indicated 12.1242 per cent., the amount agreeing nearly with the weight of the tannin isolated. One of the tannins was sparingly soluble in cold water. The reactions of the four varieties of tannin were similar: blue black with ferric salts; black green with ammonium vanadate; copper acetate brown; copper sulphate yellowish to brown; tartar emetic yellowish; acetate of lead yellowish, etc. Gallic acid was also obtained in notable quantities. For oxidation 1·20125 to 1·27127 gm. of the four varieties of tannin required 1 gm. of potassium permanganate. By decomposition with alkalies the tannins yielded protocatechuic acid, and by treatment with dilute sulphuric acid phlobaphene, ellagic acid and gallic acid were obtained.

Pastinaca sativa, Lin.—The fresh and dried root were analyzed by Jos. T. Bennett, who found volatile oil, traces of tannin, coloring mat-

ter, sugar, hard tasteless resin, soft resin (having a somewhat burning taste and soluble in petroleum benzin), and gum, but no starch; an alkaloid could not be detected. Several of the products administered to cats produced no symptoms of poisoning.

Prof. Power considers the wild-grown parsnip root to be not poisonous, and refers to communications from Dr. J. J. Brown, of Sheboygan, Wis., and Dr. Vasey, of Washington, D. C., in confirmation of this view. The popular belief that wild parsnip root is poisonous, may have originated from mistaking for it the roots of the cowparsnip, Heracleum lanatum, *Mich.*, water-parsnip (Sium), and other tall umbelliferous plants.—*Contributions Dep. Phar., Univ. Wis.*, 1886, p. 39–44.

The Leaves of Podophyllum peltatum, Lin., collected soon after flowering, have been analyzed by Benj. F. Carter (*Contrib. Dep. Phar., Univ. Wis*, 1886, p. 35–38), who determined the presence of acetic acid, coloring matter, probably a kind of tannin and uncrystallizable sugar. Alkaloids are absent. The resin amounted to 6 per cent., was greenish black of an oily appearance, soluble in alkalies and completely precipitated by acids, also freely soluble in alcohol, 90 per cent. soluble in ether, 86 per cent. in chloroform, 72 per cent. in carbon disulphide, 67 per cent. in benzol, and 40 per cent. in petroleum benzin; it also dissolves to a considerable extent in boiling water. Ether dissolves the soft resin, the hard resin remaining behind. Fused with potassa a very small amount of protocatechuic acid appears to be formed. The resin has a bitter taste and a very much milder action than that of the rhizome.

The leaves had been previously examined by T. J. Husband, Jr. (Am. Jour. Phar., 1869, p. 200), and by Dr. S. P. Duffield (*Proc. Am. Phar. Asso.*, 1868, p. 147); the latter did not obtain any resin from the leaves collected in May, and only ·03 per cent. of resin from leaves collected late in autumn.

Lupinus luteus, Lin.—Baeyer (*Landw. Versuchs-Stat.*, ix, 168, and xiv, 164) and Eichhorn (*Landw. Versuchs-Stat.*, ix, 275) have described briefly a dextrin-like substance, which they found in the seed of this plant. It is soluble in alcohol, dextrorotatory, and converted by mineral acids into sugar which reduces alkaline copper solution. E. Steiger (*Berichte*, 1876, pp. 827-830) has obtained it as a white, hygroscopic powder, soluble in water, insoluble in ether and absolute alcohol, and having the formula $C_6H_{10}O_5$. It is not changed

by diastase, and is oxidized by strong nitric acid to mucic acid. When heated with dilute sulphuric or hydrochloric acid, it yields galactose and no glucose. This carbohydrate very closely resembles galactin (or adopting Scheibler's nomenclature galactan), obtained by Müntz from the seed of the lucerne (*Medicago sativa*). The author, therefore, proposes to call it *β-galactan.*

Itshongwe is the name of a South African plant which, according to the *Natal Mercury* of June 29, 1886, is used by nearly all the Kafir tribes for various diseases, but more especially for the fevers of the country, and also to make dogs keen in hunting. About 18 months ago, M. Joscelyn Cooke, of Estcourt, isolated from the plant an alkaloid, which is stated to be soluble in water and potassa, insoluble in ether, and soluble in hydrochloric acid; this supposed hydrochlorate does not form a double salt with platinum chloride, and on heating its aqueous solution, produces a precipitate which is soluble in diluted alcohol. The substance may possibly be a glucoside. The plant has been sent to Europe for experimentation.

Piper methysticum, Forster.—Attention has been drawn to the anæsthetic effects of this root, observed by Dr. L. Lewin (see AMER. JOUR. PHAR., March, 1886, p. 138). The acrid resin, noticed by Cuzent in 1860, seems to have been separated by Lewin (*Berl. Klin. Woch.*, 1886, No. 1) into two resins, of which β-resin is greasy and of a reddish-brown color, appearing in mass almost black. This is less active than the *a*-resin, which is yellowish-brown, has the characteristic odor of the drug, is freely soluble in alcohol, and placed upon the tongue produces a burning sensation followed by local anæsthesia.

Products of Euphorbiæ.—W. T. Thiselton Dyer reports (*Phar. Jour. and Trans.*, April 17, 1886, p. 879) that cuttings of the poisonous *oro plant*, which is used in Sierra Leone for making hedges, have been received at the Royal Gardens, Kew. They undoubtedly belong to a species of Euphorbia, but in the absence of flowers the species is indeterminable. In the opinion of N. E. Brown it does not agree with any West African species preserved in the herbarium of the Royal Gardens.

Euphorbium, obtained from Euphorbia resinifera, *Berg*, is now used in the manufacture of a durable paint for metal work, to which it adheres with peculiar tenacity, and which it preserves from corrosion; hence its value for ships' bottoms. This has created a new demand for euphorbium, the collection of which in Morocco had almost

become an extinct industry. According to J. Medley Wood, curator of the Botanic Garden at D'Urban, Natal, it has also become an article of commerce in that colony.

A gum from Angola, probably also derived from a Euphorbia, may find a use in the manufacture of kamptulicon, a variety of floor-cloth.

Parthenium Hysterophorus, Lin.; Compositæ.—This tall annual, which grows as a weed in the West Indian Islands, the Bahamas and southward to Northern Patagonia, has recently attracted attention as a febrifuge. Dr. J. R. Tovar, of Havana, reported the successful treatment of neuralgia and of intermittent fever with an alkaloid *parthenine*, given in doses of 0·1 gm. Dr. Ulrici (*Deut. Med. Wochensch.*, Feb. 8, 1886) states that the plant is known in Cuba as *escoba amarga* or *confitilla*, and contains uncrystallizable *parthenic acid*, the crystallizable alkaloid *parthenine*, and four other alkaloids; parthenine is the active principle. Dr. Guyet (*Gaz. Méd.*, May 29, p. 259) states that parthenine is a complex substance, amorphous, in black shining scales, freely soluble in water, and is efficacious against neuralgia, but useless as an antipyretic.

The stem of the plant is 2 to 4 feet high, stiff-hairy, furrowed and branched; the leaves are alternate, bipinnatifid, with the lobes obtuse, and the petiole winged; the upper leaves are pinnatifid or entire; the flower heads are in spreading panicles, hemispherical, about $\frac{1}{6}$-inch broad; the akenes are compressed and have a pappus consisting of two oblong blunt scales. The entire plant is more or less covered with short hairs. It is known in Jamaica as *wild wormwood*, *white-head*, *mugwort* and *broombush*.

Asclepiadin has been prepared by C. Gram from Asclepias curassavica, Asclepias incarnata and Vincetoxicum officinale. This glucoside is easily decomposed on being boiled with acids, or on evaporating its neutral solutions on a water bath, or even on being kept in the dry state, sugar and brown-yellow resinous *asclepin* being produced, the latter of which is entirely insoluble in water. Both these principles are poisonous.—*Arch. d. Phar.*, May, 1886, p. 414; *Arch. f. exp. Pathol.*, xxiv.

This principle was first isolated from vincetoxicum by Feneulle (*Jour. Phar. Chim.*, July, 1825), and was obtained in a purer state by Harnack (*Arch. exp. Pathol.*, ii., 303) by treating the aqueous extract with ether and alcohol, in both of which liquids it is soluble,

likewise in water. It acquires a yellowish green and dark green color by strong hydrochloric acid, is oxidized to oxalic acid by nitric acid, and is precipitated by tannin and basic lead acetate.

TYROTOXICON; ITS PRESENCE IN POISONOUS ICE CREAM; ITS DEVELOPMENT IN MILK; AND ITS PROBABLE RELATION TO CHOLERA INFANTUM AND KINDRED DISEASES.

By Victor C. Vaughan, M. D., Ph. D.,

Prof. of Physiological Chemistry in the University of Mich., Member of the State Board of Health.

About one year ago, and after two years of close investigation, the writer succeeded in isolating from some samples of cheese, which had produced alarming symptoms in many persons, a highly poisonous ptomaine, to which the name tyrotoxicon (cheese poison) was given. The effects of this poison were demonstrated repeatedly upon some of my students, who kindly offered themselves as subjects of experimentation, and upon myself. These were found to agree closely with those observed by the physicians who treated the persons made sick by eating of the cheese. There were reported to the Michigan State Board of Health about 300 cases. The most prominent symptoms were dryness and constriction of the fauces, nausea, retching, vomiting and purging.

The vomited matter was frothy and the stools watery. In some there were evidences of marked nervous depression. Although in many the condition seemed alarming, all finally recovered.

A report of the discovery of tyrotoxicon in cheese will be found in *Zeitschrift für physiologische Chemie*, B. X, Heft 2; also in the Annual Report of the Michigan State Board of Health, for the year 1885.—See also Am. Jour. Pharm. July, 1886, p. 342.

Last November a student brought to me a four ounce bottle partly filled with milk which had stood tightly closed with a glass stopper for about six months. From this I succeeded in isolating the same poison. It was recognized by its crystalline appearance and by its effect upon myself. It was presumed that this milk was normal in composition when first obtained; but of this we could not be certain.

I then put several gallons of normal milk in perfectly clean bottles with glass stoppers and allowed these to stand in my work room. From time to time a bottle was opened and the test for tyrotoxicon

was made. These tests were followed by negative results, until about three months after the experiment was begun. I then succeeded in getting the poison from one of the bottles. The method of testing for it was as follows: The coagulated milk was filtered through heavy Swedish filter paper. The filtrate was colorless and decidedly acid in reaction. It was rendered feebly alkaline by the addition of potassium hydrate, then agitated with ether. After separation the ethereal layer was removed with a pipette, allowed to run through a dry filter paper to remove a flocculent, white substance which floated in it, and then allowed to evaporate spontaneously. If necessary this residue was dissolved in water and again extracted with ether. On the evaporation of the ether the tyrotoxicon was recognized by its crystalline appearance, by its odor, and by placing a small bit on the tongue. As the ether takes up some water, there is usually enough of the latter left after the spontaneous evaporation of the ether to hold the poison in solution, and in order to obtain the crystals this aqueous solution must be allowed to stand for some hours in vacuo over sulphuric acid.

From one half gallon of the milk there was obtained quite a concentrated aqueous solution of the poison after the spontaneous evaporation of the ether. Ten drops of this solution placed in the mouth of a small dog three weeks old caused, within a few minutes, frothing at the mouth, retching, the vomiting of frothy fluid, muscular spasm over the abdomen, and after some hours watery stools. The next day the dog seemed to have partially recovered, but was unable to retain any food. This condition continuing for two or three days, the animal was killed with chloroform. No examination of the stomach was made.

It may be remarked here that I have elsewhere pointed out the necessity of using pure ether for these extractions, as some samples of ether contain an irritating, ptomaine-like substance.

June 13, 1886, I received from Dr. Henry B. Baker, Secretary of the Michigan State Board of Health, a pint bottle about two-thirds full of melted ice cream, with the request that I analyze it, as some 18 persons had been seriously affected by eating of it. Dr. Baker also sent some of the vanilla which had been used as flavoring. It was thought that the poison would be found in the vanilla, because some lemon ice cream furnished at the same gathering had not affected those who ate it. As the readiest means of deciding this, my as-

sistant, Mr. Novie, and myself, took at first, 30 drops of the vanilla extract. No ill effects following this, Mr. Novie took two teaspoonfuls more, with no results. This settled the question of the poisonous nature of the vanilla more satisfactorily than could have been done by a chemical analysis.

We then added some distilled water to the cream and, after thorough agitation, filtered it. The filtrate was tested for tyrotoxicon by the method already given. The aqueous solution, after the spontaneous evaporation of the ether, was given to a cat. Within ten minutes the cat began to retch, and soon it vomited. This retching and vomiting continued for two hours, during which time the animal was under observation, and the next morning it was observed that it had passed several watery stools. After this, although the cat could walk about the room, it was unable to retain any food. Several times it was observed to lap a little milk, but on doing so it would immediately begin to retch and vomit. Even cold water produced this effect. This condition continuing, after three days the animal was placed under ether and its abdominal organs examined. We certainly expected to find marked inflammation of the stomach. But we really did find the stomach and small intestines filled with a frothy, serous fluid, such as had formed the vomited matter, and the mucous membrane very white and soft. There was not the slightest redness anywhere. The liver and other abdominal organs seemed to be normal.

It should be remarked that this cat was about two months old. Attention is called to this, because young animals are affected by this poison much more readily than older ones. It requires a comparatively large amount of the poison to cause any marked symptoms in an old cat.

After having made these experiments, I received from Dr. R. C. Moffitt, of Lawton, Mich., the following letter:

LAWTON, MICH., June 21, 1886.

DEAR DOCTOR:—I understand from Prof. Chas. Lawton, of this place, that the cream sent to Lansing, for examination, has been forwarded to you, so I write to give you the particulars. About two hours after eating the cream every one was taken with severe vomiting, and after from one to six hours later with purging. The vomit was of a soapy character, and the stools watery and frothy. There was some griping of the stomach and abdomen, with severe occipital headache, excruciating back-ache and 'bone' pains all over, especially marked in the extremities. The vomiting lasted from two t

three hours, then gradually subsided, and everybody felt stretchy, and yawned in spite of all resistance. The throats of all were œdematous. One or two were stupefied; others were cold and experienced some muscular spasms. A numb feeling, with dizziness and momentary loss of consciousness, was complained of by some. Temperature was normal, and pulse from 90 to 120. Tongue, dry and chapped. All were thirsty after the vomiting subsided, and called for cold water, which was allowed in small quantities, with no bad results. After getting out no one of the victims was able to be in the hot sun for several days, and even yet (about ten days after the poisioning) the heat affects myself. I attended twelve persons, besides being sick myself, and all were affected pretty much the same way. Several complain yet of inability to retain food on the stomach without distressing them. The man who made the cream took a teaspoonful of it, and he vomited the same as those who ate a whole dish, but not so often nor for so long a time. All are affected with an irresistible desire to sleep, which can scarcely be overcome. Even yet, some of us feel that drowsy condition, with occasional occipital headache.

Yours fraternally, "R. C. MOFFITT, M. D."

It will be seen from the above, that the symptoms produced in the persons agree closely with those observed in the cat. Cases of poisoning from ice cream are by no means rare, and I hope that those who have the opportunity will not fail to test for tyrotoxicon. In the report of the Brooklyn Board of Health for 1885, an instance is given of the poisoning of more than 100 persons from ice cream, sent out from one restaurant. The chemist was unable to detect any mineral poison. The injurious results were attributed to the use of decomposed gelatin; but no gelatin of any kind was used in the Lawton cream. Other cases occurring in New York and Brooklyn, have been attributed to the employment of artificially prepared vanillin for flavoring; but the vanilla extract used in the Lawton cream was not poisonous, as has been shown.

As I write this, I notice in the daily papers, the report of the fearful poisoning from ice cream, near Leamington, N. J. The papers state that the poisonous substance is arsenic, but how this has been determined is not given. I suppose that arsenic has been named from the symptoms. If it be true that the cream was made from milk brought in by the quart or gallon, by those participating in the festivities, the chance of mixing some milk containing the germ, which must produce the poison, with the good and thus contaminating the whole, was as favorable as it could well be. Of course, if a chemical analysis shows the presence of arsenic, the question is settled; but in all similar instances, chemical analysis has demonstrated the absence of mineral poisons.

The circumstances under which tyrotoxicon develops require farther study. As has been shown above, it may develop in normal milk kept in a clean bottle for three months; but it is evident that in some instances it appears much earlier. The production of the ptomaine is, in all probability, due either directly or indirectly, to the growth of some micro-organism. In the cheese, Dr. Sternberg found a new micrococcus; but whether or not there is any relation between this organism and the poison remains to be determined. In the cheese, milk and cream, in all of which I have found the poison, there was present more or less butyric acid, and it may be that there is some intimate relation between butyric acid fermentation and the production of the poison. Some years ago Selmi obtained a ptomaine which resembles coniine, and pointed out that it might be formed by the action of butyric acid on ammonia, thus:

$$\underset{\text{(Butyric Acid.)}}{2C_4H_8O_2} + \underset{\text{(Ammonia.)}}{NH_3} - 2H_2O = \underset{\text{(Coniine.)}}{C_8H_{15}N}.$$

or thus: $2C_4H_8O_2 + NH_2 + 2H - 4H_2O = C_8H_{15}N$.

In like manner other fatty acids may react with decomposing nitrogenous substances, forming alkaloidal bodies. Tyrotoxicon has no special resemblance, so far as is known, with coniine, but the possibility of these alkaloidal substances being formed in this way is worthy of mention. T. Lauder Brunton, in referring to the writer's discovery of tyrotoxicon, states that from the action of the substance he would infer the presence of two poisons. This is altogether possible. The writer has not been able to obtain the poison, as yet, in quantities sufficient to enable him to make an ultimate analysis of it. But that it is a chemical body produced by fermentation there can be no doubt.

If there be any doubt about the poison being produced by fermentation, the following experiment would seem to clear it up.

June 26, I took two samples, of one pint each, from a bottle of milk which had already undergone the lactic acid fermentation. These samples were placed in clean glass graduates. To one, a piece of the solid portion of the poisonous custard, about the size of a filbert, and which had been washed with distilled water, was added. To the other no addition was made. These samples stood side by side for forty-eight hours. Both were then tested for tyrotoxicon. The one to which no addition was made gave no crystals, no odor, and and when given to a cat produced no effect. The one to which the

addition had been made, yielded crystals which had the odor of tyrotoxicon, and which, when given to a very large old cat, produced frothing at the mouth and retching, but no vomiting or diarrhœa, and the next day the animal was able to eat food and seemed to have recovered. I am quite certain that had this been administered to a young animal, the result would have been more marked.

It is well known, that milk, while undergoing the lactic acid fermentation, does not possess any such poisonous properties as those belonging to tyrotoxicon. There is no evidence, then, that the poison is connected in any way with the ordinary decomposition of milk. The following extracts from a letter just received from the maker of Lawton cream shows that the attention given to the milk and vessels was all that could be desired:

"The milk of which the cream was made, was fresh and sweet morning's milk, only reserving with it the cream of the milk of the night before from the same cows. The milk is kept in a cool, clean milk cellar. The custard was made about noon that day and immediately afterward the process of freezing was begun. The vessels were all thoroughly cleaned. There was no possibility of any impurities adhering to them, for they were scalded, wiped and dried before being used. The only ingredients used were the milk, cream, eggs, sugar (best granulated) and the flavoring.

"The lemon cream was frozen first, then taken out, put into the packers, and packed solid with ice and salt. Then the vanilla cream was frozen in the same manner. I used the best Jenning's extract, about the usual quantity, not in excess. The cream was eaten in the evening by many people of the village. All of those who ate of the vanilla cream were made sick, and none of those who ate of the lemon cream suffered any inconvenience.

"Now, the milk was the same in both, milked from the same cows the same morning that the cream was made, so that there was no difference in the custard used in making the vanilla cream and the lemon cream, but it turned out that the one made people sick and the other did not.

"We have continued making cream since in the same manner without the least change of the ingredients or the apparatus, except we have not used vanilla extract, but lemon and pineapple, and it has been freely eaten and no one has been made sick by it.

"Clearly in my mind the milk does not account for the trouble. One thing further: of course the cream which you examined, has been made since the ninth day of June, and may have undergone changes which would result in generating the poison referred to in the papers [certain newspaper accounts of the finding of the poison], and which would not have been found in the cream had it been examined when fresh.

"If there is anything farther that I can furnish you in regard to these facts or circumstances in connection with this ice cream, I will be willing at any and all times to give the fullest information possible. Hoping to receive the correct analysis soon, I remain yours respectfully, "J. W. JOHNSON."

That the poison which I found in the cream was the same as that which affected the people can not be doubted after comparing the symptoms produced in the cat with those observed by Dr. Moffitt, and as has been stated, the experiment on the cat was made before I received the letter from Dr. Moffitt. The cream was made on the 9th of June, and the poison separated on the 14th.

I wrote to Mr. Johnson asking several questions, which he has kindly and fully answered. As the nature of the questions is shown in the answers, I will simply give the answers:

"(1.) The milk from all the cows was mixed together in the making of the custard."

"(2.) The custard for the lemon and vanilla was all one custard; made and mixed before the extracts were put in."

"(3.) We had previously used the same brand of extracts (Jenning's best), both lemon and vanilla, with no bad results."

"(4.) The food of the cows in the morning and evening, consists of oats and corn, ground together and fed dry, with clover and hay. I have never seen anything suspicious in the pasture or food. There is a running stream of water coming from a spring in the pasture. There is plenty of shade. At evening the cows are driven from the pasture and placed in the stable or yard, according to the season. The stable and yard are open for inspection at any time. My residence is in the center of the village, and the board of health would not allow me to stable and yard my cows there if there were any bad odors during the summer."

"(6.) The teats are thoroughly washed before each milking."

After receiving the above details concerning the making of the cream, the following experiment was made:

July 8. To one quart of night's milk a piece of the solid portion of the Lawton cream, about the size of a filbert, was added. This residue had been left in the filter paper ever since the analysis of the poisonous cream, June 14, and it was on June 8 that the first milk for the preparation of the Lawton cream was collected. This dried and hardened lump was crumbled into the milk, which was placed in a clean tin pan and set in a cool cellar. July 9, to a quart of morning's milk, another small bit of the infected material was added, and this milk was also placed in the cellar. At 1 P. M. both portions of milk were poured into a clean earthenware jar, and four fresh eggs

beaten, and one pint of granulated sugar were added. The whole was thoroughly agitated, then allowed to stand at the temperature of the room until 4 P. M., when it was placed in the ice-box of a refrigerator, surrounded by ice and here kept until 7 A. M., the next morning, July 10. Then three ounces of the custard was stirred up with distilled water, filtered, the filtrate rendered alkaline and agitated with ether. The residue on the evaporation of the ether was dissolved in a little water and given to a kitten about two months old. Immediately the kitten manifested the symptoms of poisoning by tyrotoxicon, which have already been described. I began the analysis of this custard in the morning before having my breakfast, and getting a little on my finger in carrying the jar, I tasted of it. Within a very few minutes I was nauseated, and ten minutes after I vomited. The prompt action of so small a quantity was probably due to the condition of my stomach. At 2 P. M. of the same day, I took one teaspoonful of the custard. Within thirty minutes there was marked nausea and some violent retching, but no vomiting. At 3 P. M., the symptoms having abated, I took a tablespoonful more of the custard. At about 3.30, I began to vomit freely. The nausea continued for about an hour. After this there would be passing sensations of sickness. At 8 P. M, while visiting a patient, I was taken very suddenly and sharply with nausea and griping pains in the abdomen. I again vomited and had a watery stool. After this there was no farther trouble. The occipital headache mentioned by Dr. Moffitt in his letter, was very marked for some hours after taking the custard. It consisted of sharp, lancinating pains which were confined wholly to the occiput. The nausea was peculiar. I cannot say that there was pain in the stomach. A sickening taste would be felt in the mouth and a peculiar, very sickening odor, which I recognized as that of the isolated poison, would intensify the nausea. The throat and mouth seemed filled with a sticky, tenacious mucus. In short, the effects on these parts resembled those which I have experienced from an overdose of atropia.

I think that this experiment explains the poisonous nature of the vanilla cream. The fermentation going on in the custard, and probably begun in the milk, was arrested in that part flavored with lemon by the freezing which was begun immediately. But while the lemon cream was being frozen, that part of the custard which was to be made into vanilla cream continued to ferment, and before the freezing

process was begun enough of the poison was generated to seriously affect those eating of it.

It should be remarked, that in the custard which I made there was nothing peculiar in the taste. It was sweet and pleasant. But while it was not at all acid to the taste, it gave a decidedly acid reaction as tested by litmus, and was not amphoteric in reaction, as cow's milk frequently is.

It is possible that the presence of the large amount of albumen in the custard, from the eggs, hastened fermentation. I believe that makers of cheese have found by experience that a large amount of albumen in cheese renders decomposition more easy.

How the special germ which produces the poison found its way into the Lawton cream I cannot say; but that it was either present in the milk or was contained in the eggs used, I think cannot now be doubted.

TYROTOXICON, AND CHOLERA INFANTUM.

I desire to call attention to the great similarity between symptoms of poisoning by tyrotoxicon, and those of cholera infantum. I am aware of the fact that the term "cholera infantum" is used by many in referring to almost any summer diarrhœa of children; but restricting the term to the violent choleraic diarrhœa, as is done by Smith and other best authorities on the subject, we shall find its similarity to poisoning by tyrotoxicon very marked.

The suddenness and violence of the attack, the nausea and vomiting without marked tenderness of the abdomen, the character of the stools, the great thirst, the severe pain in the back of the head, the nervous prostration, and the tendency to deep sleep, are all observed in both. Again, the white, soggy appearance of the mucous membrane of the stomach of the cat corresponds exactly with observations in children after death from cholera infantum. Cholera infantum, as is stated by Smith, "is a disease of the summer months; and, with exceptional cases, of the cities." Thus, the disease occurs at a time when decomposition of milk takes place most readily. It occurs at places where absolutely fresh milk often cannot be obtained. It is most prevalent among classes of people whose surroundings are most favorable to fermentative changes. It is most certainly fatal at an age when there is the greatest dependence upon milk as a food, and when, on account of the rapid development of intestinal follicles, there is the greatest susceptibility to the action of an irritant poison, and when

irritative and nervous fevers are most easily induced. If all these facts be taken into consideration, along with the experiments which have been detailed, and which show the readiness with which the poison can be generated, it will certainly seem at least probable to any one that tyrotoxicon may be a cause of cholera infantum. A little dried milk formed along the seam of a tin pail, or a rubber nipple, tube or nursing bottle not thoroughly cleansed, may be the means of generating, in a large quantity of milk, enough of the poison to render it highly harmful to children. The high temperature observed in children with cholera infantum, and which has not been observed in adults poisoned by tyrotoxicon, may be caused by the continued administration of milk, and by the greater susceptibility of the sympathetic nervous system in children.

If this casual relation does exist between tyrotoxicon and cholera infantum, a knowledge of it will aid us, not only in the preventive, but in the curative treatment of the disease. The first thing to do in the treatment of the disease is to absolutely prohibit the further administration of milk, either good or bad, because the fermentation going on in the intestine would simply be fed by the giving of more milk, even if that milk be of unquestionable purity. I would suggest that some meat or rice preparation be used for food, though experience will soon give us valuable information on this point.

A germ which forms a poisonous ptomaine by its growth in milk may be wholly harmless when placed in a meat or rice preparation.

Secondly, mild antacids should be administered, because the poison, so far as our information goes, is produced only in acid solutions. The great value of the chalk mixture in the treatment of the disease is well known.

Thirdly, theoretically at least, the employment of small doses of some disinfectant would be of benefit. I find that there is considerable difference of opinion in the professsion as to the use of small doses of calomel in this disease.

Fourthly, the use of opium in some form is consistent with this theory.

And lastly, the administration of stimulants, brandy and ammonia, to counteract the depressing effects of the poison already formed and absorbed, should be practiced.

All of these, save the first recommendation, have been practiced in

the treatment of the disease empirically; but the first—absolute discontinuance of the use of milk—I regard as of prime importance.

Of course, it will be understood that attention to securing fresh air, and to other hygienic measures, is also desirable.

It is altogether probable that an amount of the poison which would escape chemical detection, might be sufficient to produce poisonous effects in children.—*Report of Michigan State Board of Health.*

Ann Arbor, July 12, 1886.

EDITORIAL DEPARTMENT.

Pharmacy in France.—A bill is pending in France modifying in several respects the laws now in existence. The important features of the new bill may be summed up as follows:—

The practice of pharmacy is restricted as heretofore to those possessing the diploma of *pharmacien* from one of the French schools of pharmacy. It is proposed to have hereafter only one form of diploma, to abolish that for pharmacist of the second class, and to remove the locality restrictions now applying to those having the latter diploma. A pharmacist is not permitted to conduct more than one store, nor to deal in articles other than such belonging to the healing art; he may take a non-pharmacist – but not a physician—as partner, but the business must be carried on solely by one legally qualified. Physicians are permitted to furnish medicines only in cases of urgency, or when located at a distance of more than five kilometers from a pharmacy, but they are not permitted to keep open shop. The labels must bear the pharmacist's name, and special labels must be provided for medicines intended for external use. The pharmacist may sell the preparations of the codex under their official names, and may furnish without the prescription of a physician simple or compound medicines, the label to give the names of the active ingredients; but certain drugs and poisons, which will be duly mentioned in the codex, must be furnished only upon the order of a qualified physician. A list of harmless drugs and preparations, the sale of which is intended to be free to all, is to be published in the codex; the sale of all others will be restricted to pharmacists. For the benefit of their own members, certain societies will be permitted to have pharmacies, each to be under the supervision of a legally qualified pharmacist; the pharmacies of hospitals may be conducted under the supervision of the medical staff. The widow or heirs of a deceased pharmacist may continue the business for one year under the management of a pharmacist. The codex is to be revised every ten years by a commission appointed by the ministers of public education and of commerce, and consisting of an equal number of professors of medical schools, professors of pharmaceutical schools, and of pharmacists engaged in business; two

veterinary surgeons are to be added to this commission. Supplements to this codex may be issued yearly if necessary. The penalties vary in different cases from 16 to 3000 francs.

The corps of military pharmacists organized in 1791 was, in 1882, placed under the control of the medical department of the army, and a bill has been prepared by the minister of war, with the view of abolishing it altogether. There are at the present time 184 military pharmacists in the service.

The University of Brussels, the semi-centennial existence of which was solemnized in November, 1884, has been destroyed by fire on the afternoon of July 7th last. The fire originated in the chemical laboratory, and made such rapid headway as to render the saving of the large library and of most of the valuable collections a matter of impossibility. Since 1842, the official title of the institution was *L'Université libre de Bruxelles*.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Le Curare. Par Auguste Auché, pharmacien de 1re classe. 8vo, pp. 70.

Des Illicium en général; de la badaine et son huile essentielle en particulier. Par J. Tambon, pharmacien universitaire de 1re classe. 8vo, pp. 80.

De l'huile de chaulmoogra (Gynocardia odorata), de son utilité et de son emploi en thérapeutique. Par le Dr. Eugène Marçon. 8vo, pp. 59.

The last one of these three theses is from the medical school, the remaining two from the school of pharmacy at Montpellier. That on illicium and oil of staranise deserves special mention for the handsomely executed plates illustrating the anatomy of different species. We shall endeavor to give brief abstracts from these theses in another place.

Beiträge zur gerichtlichen Chemie. Von G. Dragendorff. St. Petersburg, 1886. 8vo, pp. 39.

Contributions to forensic chemistry.

The indefatigable author describes in this reprint from the Phar. Zeitschrift f. Russland, the results of researches carried on by himself and under his supervision, and embracing the following substances: Aloin and aloes; convolvulin and jalapin; chloralhydrate; phenol; myoctonine; lobelia alkaloids; thalline and antipyrine. The dissertations on three or four of the above subjects have been already noticed in this journal, and the remaining ones will be presented in a condensed form.

Massachusetts State Agricultural Experiment Station. Bulletin No. 21. June, 1886.

It contains the analyses of a number of fertilizing materials, bran, meals and ensilage made from corn and from apple pomace.

Twenty-second Annual Report of the Alumni Association, with the exercises of the sixty-fifth annual commencement of the Philadelphia College of Pharmacy, for the year 1885–1886. 8vo, pp. 204.

The report contains the transactions of the association, various addresses, &c., and a list of members; the active membership comprising 1037 names.

Formularium of Unofficinal Preparations of the Pennsylvania Pharmaceutical Association. 8vo, pp. 54. Price 35 cents, or four copies for $1.

A reprint from Pharmac. Rundschau, New York, in which journal the formulas were ordered to be printed in advance of the proceedings (see July number, page 361). The publication in pamphlet form makes the formulas accessible to all.

The Proceedings of the following State Pharmaceutical Associations at their recent meetings have been received:

Iowa. (Meetings of 1885–1886). 8vo, pp. 147. See this Journal, 1885, p. 361, and 1886, p. 359.

Kansas. 8 vo, pp. 79. See July number, p. 359. The local secretary for the next meeting is J. P. Allen, Wichita.

Massachusetts. 8 vo, pp. 232. See July number, p. 360. Chas. E. Bardwell, Holyoke, is local secretary for the next meeting.

New York. 8vo, pp. 269. See July number, p. 361. A map of the State of New York is added as frontispiece.

OBITUARY.

Giovanni Pagliari died in Florence, Italy, July 17th, 1886, at the age of 87 years. He was born in Gubbio, Province of Rome, in 1799, and was for a number of years engaged in business as a pharmacist. His name became familiar through a benzoinated solution of alum which is known as Pagliari's hemostatic.

Notice of the deaths of the following graduates of the Philadelphia College of Pharmacy has been received:

Walter H. Cline, class 1883, was accidentally killed by a railroad train near Glassboro, N. J., in July last.

John Klemet, class 1880, died July 30th, after a lingering illness, in Philadelphia. He graduated in medicine from the Jefferson Medical College in 1883.

Ross Rambo, class 1882, recently in business at 12th and Race streets, Philadelphia, died in the latter part of July.

THE AMERICAN
JOURNAL OF PHARMACY.

OCTOBER, 1886.

SOPHORA SPECIOSA, *Bentham.*

By Moritz Kalteyer, Ph. G. and William E. Neil, Ph. G.

(Condensed from two Inaugural Essays.)

This evergreen shrub is a native of Texas and New Mexico, flourishing on rough rocky hill-sides, and avoiding the rich black soil of the prairie. Near Matagorda Bay it is a small tree about 30 feet in height; near San Antonio it attains the height of 6 or 8 feet, and grows in patches, intermingled with the mezquite, often clinging to the edge of a ledge of rock with large portions of the roots bare and exposed to the heat and cold of many summers and winters, and by its long tap-root enabled to withstand the frequent droughts. The trunk is tough, crooked and rough, with a gray-brown thin bark, and with hard and heavy yellow wood, which in some localities is called *lignum vitæ*. The leaves are impari-pinnate; the leaflets in 3 to 5 pairs, about $1\frac{1}{2}$ inch long, obovate or oblanceolate, obtuse or emarginate, entire, reticulate, dark-green and glossy above, and paler beneath. The showy flowers appear in February and March, grow in racemes, and have a blue-purple papilionaceous corolla, ten distinct stamens and a strong fragrant odor. The fruit is indehiscent, more or less moniliform, often curved, grayish-pubescent, and contains from 1 to 8 seeds. The seeds are roundish-ovate, about $\frac{1}{2}$ inch long and $\frac{3}{8}$ inch thick; the testa is hard, brittle, somewhat granular, dark-red or sometimes yellowish, and marked from the slightly flattened hilum by a longitudinal ridge. It contains a thin layer of firm whitish albumen, and an embryo of the shape of the seed, with two white, rather concavo-convex, cotyledons and a short radicle bent at a right angle. The average weight of the seed is 20 grains, that of the kernel about 12 grains, and of the integuments 8 grains. The seed is inodorous, and the taste bean-like and somewhat bitter. Though known to be poisonous, and hence



SOPHORA SPECIOSA, *Bentham.*
Flowering branch, fruits, seeds and embryo.

called *poison-bean*, it is largely used by boys in the place of marbles.

Mr. Bellinger, of Texas, states that the Indians in the neighborhood of San Antonio used the seed as an intoxicant, half a bean

producing exhilaration, followed by sleep lasting two or three days, and it is asserted that a whole bean would kill a man.

Some years ago (see AM. JOUR. PHAR., 1878, pp. 33 and 283), the seeds attracted attention through the investigation of Dr. H. C. Wood, who isolated a poisonous alkaloid, *sophorine*. Both Mr. Kalteyer and Mr. Neil found the alkaloid in the testa and in the kernel.

Mr. Neil obtained 3·2 per cent. of ash from the whole seed; Mr. Kalteyer 3·1 per cent. from the kernel, and 7·6 per cent. from the integuments; the former contained chloride, phosphate and a trace of sulphate of potassium, calcium and magesium, while in the latter phosphate and chloride of potassium and calcium, with a trace of manganese were found.

For proximate analysis the integuments and kernel were used separately; from the description given it seems that the layer of albumen was added to the embryo by Mr. Neil, and to the testa by Mr. Kalteyer.

Mr. Neil's results were as follows:

	Testa.	Kernel.
Extracted by petroleum benzin,	5.60	18·200 per cent.
" " ether,	lost	·153 "
" " absolute alcohol,	1·26	1·860 "
" " distilled water,	12·00	26·500 "

The alkaloid was found in the alcoholic extracts; slight traces of it were also observed in the other extracts from the kernel. The specific gravity of the yellowish red fixed oil, obtained by benzin from the kernel, was determined to be ·889; it was insoluble in alcohol, but freely soluble in ether, chloroform and carbon bisulphide. The presence of sugar was determined by Fehling's solution in the water extracts. As far as examined, the other constituents agree with those determined in the following analysis.

Mr. Kalteyer's results are tabulated as follows:

	Percentage from Testa.	Kernel.
By *petroleum spirit:* Saponifiable fixed oil, sp. gr., ·912,	1·300	21·050
By *ether* (resin or wax),	·100	trace
By *alcohol:* Phlobaphene,	1·000	2·610
Alkaloid, organic acids (tannin in testa) and other organic substances,	2·350	7·540
By *water:* Inorganic salts,	1·000	2·300
Mucilage,	4·150	1·500

Albumin,	——	1·750
Dextrin,	1·900	2·200
Organic acid and coloring matter,	6·900	6·000
Soluble Arabic acid?	1·050	6·573
By *caustic soda:* Mucilage and Albuminoids,	1·200	9·070
Not precipitated by acetic acid and alcohol,	3·700	4·250
By *hydrochloric acid:* Parabin,	3·750	6·450
Lignin,	6·876	4·380
Insoluble residue,	55·084	14·945
Moisture,	9·575	7·500

The coloring matter of the testa was not taken up by petroleum spirit or ether, but was freely soluble in alcohol and in alkali; it is precipitated by lead acetate, and using alum as a mordant, gave a light pink-colored dye.

The alcoholic extract was treated with water, the solution precipitated with lead acetate, treated with sulphuretted hydrogen, and both acid and alkaline, agitated with solvents; the alkaloid was taken up by chloroform from the alkaline liquid, and seems to be present in larger proportion in the testa than in the kernel. An aqueous solution gave with potassio-mercuric iodide a bulky white, and with gold chloride a crystalline yellow precipitate. Sulphuric acid and potassium chromate produced at once a muddy brown color, rapidly changing to light green, which slowly faded. Sulphuric acid gave a light flesh-colored solution; ferric chloride only a perceptible darkening.

PRELIMINARY ANALYSIS OF THE LEAVES OF JUGLANS NIGRA.

By Lillie J. Martin.

Read before the American Science Association.

So far as I have been able to ascertain no chemical study of Juglans nigra has been made. Certain constituents of Juglans are given, but the disregard of botanical requirements makes it impossible for those unacquainted with the constituents of this plant to tell whether it is this particular species. So meager are the descriptions of the mode of obtaining the various products, and their properties when found, that it is doubtful whether even a chemical study would settle the question. Unfortunately, giving a name to some substance is not giving the most minute description of it.

The leaves used in this work were picked from a fine black walnut tree in July. Sections were immediately cut and a superficial micro-

chemical examination made. Chlorophyll, oily matter, resin, probably tannin, albuminoids, starch and crystals of calcium oxalate were recognized. The leaves used in the chemical study were gathered at the same time and after being kept for five days at ordinary temperature were ground in a mill and put through a number eighty sieve.

The moisture determination made upon two grams at a temperature from 100° to 110° C. showed 8·45 per cent. The same portion was incinerated in a porcelain crucible for four hours. The odor given off during incineration was peculiar, something like fresh leather. It was of the same nature as many of the odors observed later on in the work. It was thought a volatile alkaloid might be present, but distillation with milk of lime failed to show it. The ash was of a gray color and amounted to 8·49 per cent. Qualitative analysis gave the bases calcium, magnesium, potassium, and iron. Watts' dictionary says that walnut leaves, no species given, contain aluminum, but none was found. The acids hydrochloric, sulphuric, phosphoric, silicic and carbonic, were identified.

Dragendorff's Plant Analysis was used as a guide. With petroleum spirit (boiling 25°–45°C.), Squibb's ether and absolute alcohol, two determinations were made—one upon 10 grams in Tollen's apparatus by hot extraction from 10 to 11 hours, the other upon fifty grams by cold maceration for seven or eight days, the bottle being frequently shaken, and the solvents replaced every other day.

Hot maceration gave 3·50 per cent. for the petroleum spirit extraction. Cold maceration gave but 3·00 per cent. In each case by raising the temperature to 120°C. there was a slight loss of weight. 0·20 per cent. was the loss in the amount obtained by hot extraction. By treating a quantity of the original powder with water acidified with sulphuric acid a sweet smelling liquid, having an oily substance floating on top, was obtained. The oily substance had the general action of an ethereal oil, giving up its odor and evaporating when heated. The oil doubtless passed off as the petroleum spirit evaporated. The liquid obtained in connection with the oily substance was acid. Tests showed that sulphuric acid had not been carried over. There was then a volatile acid in the plant. It was not acetic acid. It gave yellowish white precipitates with neutral and basic lead acetate and a white crystalline precipitate with barium carbonate.

The petroleum extract was fluorescent, blood-red by reflected and green by transmitted light, showing the presence of chlorophyll.

Extract was slightly acid in reaction. The residue was a greenish yellow, black colored, soft solid and had a melting point of 55° C. It had a peculiar odor. It was entirely soluble in absolute alcohol, being reprecipitated by water, the precipitate was disseminated through the liquid. 95 per cent. alcohol separated the substance into green and yellow material and then nearly dissolved it. Chloroform, benzol and carbon bisulphide dissolved the residue, the last solution giving a characteristic reaction by reason of its becoming red in color. Dilute sulphuric acid did not affect the residue. Concentrated sulphuric acid turned one part of residue brown and the other green; when water was added to this the whole dissolved. Dilute nitric acid separated a green substance from petroleum residue. Boiling concentrated nitric acid gave a floating oily substance. This was filtered and water and strong ammonia added to the filtrate—a precipitate of floating red particles was obtained, showing the presence of resinous matter. Neither ammonia, solutions of borax, chloride of lime, nor chloride of antimony affected the petroleum spirit extract. The same may be said of hot and cold aqueous solutions of sodium hydrate. Hot alcoholic solution of caustic soda dissolved most of residue, and after long boiling produced something resembling saponification.

No results were obtained on testing for alkaloids.

So far as studied the petroleum spirit extract seems to be made up of chlorophyll, perhaps a free fatty acid, volatile oil, resin and a fat of the higher acid series, or a wax.

The residual powder was dried at the ordinary temperature until the odor of petroleum spirit disappeared, and then Squibb's ether was added. Hot maceration gave 8·90 per cent. Cold maceration 3·66 per cent. extract. A loss of ·08 per cent. was observed on raising the temperature to 120° C. The ether extract was fluorescent and gave a neutral reaction. The residue was a glossy black amorphous solid and had the odor of fresh leather. The residue was entirely soluble in carbon bisulphide and chloroform, but was not crystallized out of these solvents. Benzol and acetic ether dissolved but a part of residue. Sulphuric acid turned it green, when sugar was added no change was observed. Part of ether residue was soluble in water. Gelatin showed tannin to be present in the aqueous solution. It is to be regretted that Squibb's ether has sufficient alcohol left in it to remove tannin. The tannin was removed from the water solution of the ether extract by lead acetate, the lead by hydrogen sulphide, and the hydro-

gen sulphide by boiling. The filtrate was then tested for glucosides but none were found. Various tests seemed to indicate the presence of an alkaloid but the precipitates given were due I suppose to tannin. Certainly agitation with petroleum spirit, benzol and chloroform failed to bring to notice either an amorphous or crystalline residue. The portion of ether residue insoluble in water was treated with absolute alcohol. Nearly all was soluble in cold absolute alcohol and the part remaining dissolved on boiling. The portion of ether residue in water and cold absolute alcohol was not dissolved by aqueous nor by alcoholic solutions of potassium hydroxide.

The ether extract was composed of chlorophyll, tannin and resin. The material left after the extraction was dried at the ordinary temperature until the ether odor had nearly disappeared, and then absolute alcohol was added. Absolute alcohol removed 10.20 per cent. by hot extraction. .70 per cent. of this was ash, giving an organic extract ot 9.50 per cent. Cold maceration took out 8.58 per cent. Extract was fluorescent and acid in reaction. The residue was a sticky, black, amorphous solid, and had the odor of fresh leather. Part of the residue was soluble in water. Tannin was found in this. A measured quantity was precipitated by lead acetate. An equal amount of fresh portion by acetate of copper. The lead threw down more matter than the copper. This looked as though something besides tannin was present. In testing for alkaloids only those tests gave reactions that would have done so by reason of the presence of tannin. The water solution from the alcoholic residue was acidified with sulphuric acid, and successively shaken with petroleum, benzol and chloroform. After the chloroform had been removed by petroleum, the solution was made alkaline and shaken as before. The alcoholic residue that was left after treatment with water, was treated with water acidified by sulphuric acid and agitated as before. Microscopic crystals appeared in all the residues. These were examined with much interest. Even if these minute crystals have nothing to do with alkaloids or glucosides, they are not therefore to be despised. Have they not in times past kept up the courage of the investigator longing to discover a new alkaloid while he went through the tedious process of searching for it? Besides these .001 m m diameter crystals, there were others that could be readily seen by the naked eye. They were obtained from the aqueous solution by agitation with acid petroleum spirit, and were accompanied by coloring matter. This amorphous and crystalline residue, blackened

under sulphuric acid and left little residue on platinum. It did not blacken ferric chloride; it reduced Fehling's solution; it gave no reactions with Mayer's solution, triiodide of potassium, cadmium iodide, gold or platinum chloride. It must then be glucosoidal in nature.

That part of alcoholic residue insoluble in water alone, in water acidified by sulphuric acid and in ammonia, was found to contain resin.

Chlorophyll, tannin, a glucoside, coloring matter and resin, were found in the alcoholic extract.

The water, acid and alkaline extractions, were made only upon the residual powder from the ten grams. Treatment was continued for about three days, the solvents being replaced daily and the portions filtered off preserved by adding a little alcohol.

Residue after treatment with alcohol, was dried at a little above ordinary temperature until alcohol odor had almost disappeared, and then treated with cold water. The water extract amounted to 14.50 per cent., the ash was 2.00 per cent., making organic extract 12.50 per cent. The green and pink particles in the ash were very noticeable. The water extract had the color of port wine. Residue was brown in color and odorless. Nitrogen was found in it. Tests showed all the tannin had been removed. An aliquot part of extract was mixed with two volumes of alcohol and allowed to stand twenty-four hours. The precipitate obtained was washed with alcohol and then dried. It gave 3.20 per cent. of which .80 per cent. was ash. This precipitate was dark brown in color, almost wholly soluble in water to mucilaginous liquid, and reduced Fehling's solution. Part of the filtrate from the gum precipitate was evaporated to a syrupy consistency and four volumes of alcohol added. A slight precipitate proved that a trace of dextrin and other carbohydrates were present. The filtrate from this precipitate reduced Fehling's solution. Fehling's solution applied to a measured portion of the original water extract gave 1.14 per cent. glucose. As was anticipated by the results above, the same quantity of water extract after being boiled with sulphuric acid did not give an appreciable greater amount of glucose.

An aliquot part of the filtrate from the gum precipitate was concentrated and afterwards precipitated with neutral lead acetate. The precipitate amounted to 9.80 per cent., of which 6.00 per cent. was lead oxide. The organic acids and allied substances amounted to 3.80 per cent. An unsuccessful attempt was made to identify the acids. The

water extracts contained mucilage, glucose, organic acids and allied substances and albuminoids.

Dilute caustic soda solution was applied to the residue after extraction with water. Whole caustic soda residue equalled 12.20 per cent., ash 7.40 per cent., organic residue equalled 4.80 per cent.; both extract and residue were brown in color and odorless. A measured portion of the extract was acidified with acetic acid, 90 per cent. alcohol added and this was allowed to stand twenty-four hours. .80 per cent. mucilaginous substance, albuminoids and ash were found. The filtrate from this precipitate was evaporated to dryness, and a substance almost entirely soluble in water, but not precipitate by alcohol, was found. Nitrogen was present in this substance. The alkaline extraction showed mucilaginous substances and albuminoids.

After one washing, very dilute hydrochloric acid was added to residue. It extracted 14.82 per cent., 5.32 per cent. of which was ash, and 9.50 per cent. organic matter. The amounts of starch and calcium oxalate which the microscope had shown to be present, were not obtained.

The residual powder was bleached with chlorine water to extract lignin, etc.; cellulose, etc., remaining.

SUMMARY:

I.—The quantative results were as follows:

a. From Ten grams by Hot Extraction.

Moisture,.....	8.45 per cent.
Ash,.....	8.49 "
Organic Petroleum Spirit Extract,...	3.50 "
" Ether,.....".....	8.50 "
" Absolute Alcohol Extract,..	9.50 "
" Water,.....".....	12.50 "
" Alkaline,....".....	4.80 "
" Acid,.....".....	9.50 "
Total,	65.64

b. From Fifty grams and Cold Maceration.

Organic Petroleum Spirit Extract,...	3.00 per cent.
" Ether,.....".....	3.66 "
" Absolute Alcohol Extract.....	8.58 "

Comparison of these results shows that as far as the work was carried, cold maceration gave a smaller extraction than hot. This was, probably, mainly due to a difference in the amount of chlorophyll taken out. Hot extraction tending to throw the chlorophyll forward. More time for cold extraction would have increased the amount of extract, doubtless, for when at the end of each extraction a new portion

of solvent was added and a little afterwards evaporated on platinum foil, a decided residue remained. This proved that the seven or eight days maceration suggested by Dragendorff does not exhaust this plant. For relative results this time may be sufficient.

II. The qualitative results in (*a*) the two preliminary microchemical examinations gave similar results. Four bases, calcium, magnesium, potassium and iron. Five acids, sulphuric, hydrochloric, phosphoric, silicic and carbonic. Also, chlorophyll, volatile oil, a volatile acid, resin, a fat of the higher acid series or a wax, tannin, glucoside, mucilage, organic acids and allied substances, glucose, albuminoids, lignin and cellulose; of these tannin seems to be the controlling principle in the plant.

(*b*) The preliminary microchemical examination gave chlorophyll, resin, probably tannin, albuminoids, starch, calcium oxalate, lignin and cellulose. It will be observed that about half as many substances were identified by the microscope as by putting the plant through a regular course in proximate analysis. This number is sufficiently large to emphasize the value of a preliminary microchemical examination of any plant taken up for study, since it furnishes information that enables one to work to better advantage. The information too that might be obtained as to the position of the various compounds in the plant, would be valuable. In that case, however, the mode of procedure would be different. It would then be necessary to make sections of the plant, and treat them as the powder is treated, making similar tests at every step. While the microscope is of much value in chemical work, it can in its present state of perfection, in no way supply the place of a careful chemical examination. It bears the same relation to the preliminary proximate analysis of a plant, as the general tests that precede the regular qualitative examination of a substance in inorganic chemistry.

This work was done in the chemical laboratory of the PHILADELPHIA COLLEGE OF PHARMACY, during July, 1886.

Oxalic Acid as an Emmenagogue.—M. V. Poulet (*Gaz. hebdom. de méd. et de chir.*, May 14, 1886), has used oxalic acid for amenorrhœa from various causes, and regards its effects as marvelous, including an amelioration of the pain in cases of dysmenorrhœa. He gives it according to the following formula:

Oxalic acid	2 parts.
Warm water	200 "
Syrup of bitter-orange peel	60 "

A teaspoonful is to be taken every hour.—*N. Y. Med. Jour.*

ON BUCHU AND OIL OF BUCHU.

By R. Spica, Professor at the Royal Institute of Venice.

Translated and abridged from Annali di Chim. Med. Farmac., 1885, p. 233, by Joseph W. England, Ph. G.

In 1827 Cadet de Gassicourt (*Jour. de Pharm.*, xiii, 106) found that 100 parts of buchu leaves contain 0·6 to 0·8 parts of an ethereal, yellow oil, lighter than water, 21·17 parts of gum, 5·17 parts of extractive, 1·1 parts of chlorophyll and 2·15 parts of resin. Brandes (*Arch. Pharm.*, 1827, xxiii, 229) prepared, besides the ethereal oil, etc., a glutinous, amorphous substance, soluble in water, chemically allied to colocynthin and cathartin, which he called diosmin. Bedford obtained from the leaves of *B. serratifolia*, 0.66 per cent. of volatile oil and from *B. crenata* and *B. betulina* 1·21 per cent. Landerer (*Buchn. Repert.*, 1830, xxxiv, 63), by extraction with alcohol, found a crystalline body, insoluble in water, to which he gave, also, the name diosmin. Jones, (*Pharm. J. Trans.*, 1879, ix, 673) determined the quantities of ash in the several species to be from 4 to 5·5 per cent., containing a large quantity of manganese, and by successive treatment with solvents, ascertained that 3·8 to 5·86 per cent. was soluble in ether, 7·7 to 15·7 per cent. in alcohol and 13·9 to 22·38 per cent. in water. Wayne (Am. Jour. Phar., 1876, p. 18) found that the ethereal oil, treated with caustic soda, and then with hydrochloric acid, gave crystals, which he claimed were salicylic acid. Flückiger, whose researches (*J. Pharm.*, 1880, ii, 404 and *Pharm. J. Trans.*, 1880, No. 533, p. 219) are very important, made his experiments upon *B. betulina*, using the ethereal oil obtained from 35 kilograms of leaves, (180 gm. of oil), from which he secured a solid crystalline body, fusing at 83° C., boiling at 233° C., which he called diosphenol, and ascertained the chemical formula to be $C_{14}H_{22}O_3$; also, an oil isomeric with borneol $C_{10}H_{18}O$, boiling at from 205° to 208° C. J. M. Maisch, finally, studying the ethereal oil of *B. betulina*, (Am. Jour. Phar., 1881, p. 331), confirmed the data of Flückiger and disproved Wayne's statement concerning the presence of salicylic acid, which, while sometimes present, was thought to be due either to fermentation or to the presence of other leaves among the buchu examined.[1]

[1] In the translator's opinion, if the results of Prof. Spica, be accepted, the more probable theory would seem to be, that salicylic acid does not pre-exist in the leaves; but since a portion or all of the elæopten and the stearopten is of phenylic origin, that that portion is decomposed, first, by the added soda, to form sodium salicylate and then, by the hydrochloric acid, to form salicylic acid,

Extraction of Volatile Oil.—The leaves in a finely powdered state, were distilled until no more oil passed over. The oil was lighter than water and left, while floating upon the surface of the liquid, prismatic crystals. The aqueous distillate contained a feeble acid, whose chemical nature together with that of the residual, strongly acid, brown liquid remaining in the retort, will be further examined. In order to obtain a larger quantity of the volatile oil, the process of extraction was modified and repeated upon more material. The powdered leaves were macerated with ether for three days, when the liquid became green in color from dissolved chlorophyll. The larger quantity of ether was then distilled off, while the balance was evaporated, spontaneously, and the oily residue distilled with steam, until no further oil passed over. Every 1000 parts of leaves yielded about 6·5 parts of a greenish yellow oil, having a grateful odor, similar to peppermint and bergamot, and lighter than water. Separated from the water and desiccated over fused calcium chloride, a portion was fractionally distilled. The greater part passed over between from 200° to 235° C., and the last portions were manifestly decomposed and gave a different and rather more phenol-like odor than the first. In order to ascertain if the first fractions contained substances soluble in potassium hydrate, a small quantity of the mixed fractions was agitated with KHO, in strong solution, after which separation into two parts took place. Using a second quantity, with a more dilute solution of KHO, it became evident that the KHO solution was not as sensibly colored, as in the first instance. The insoluble part (elæopten) was then separated, washed with water and desiccated over fused calcium chloride, while the aqueous washings were added to the KHO solution and the remaining elæopton was removed by agitation with ether. The alkaline solution was then treated with hydrochloric acid until slightly acid, when a precipitate formed which, after several minutes, assumed a crystalline aspect. The supernatant liquid was removed and the residue agitated with ether, the ethereal solution evaporated at a low temperature, when the stearopten crystallized in the form of long, flat needles, slightly impure from adhering brown oil.

Examination of the Elæopten (*Diosmelæopten*).—It is a greenish

in a similar manner to oil of wintergreen, when that liquid is treated with the same reagents. Further, it is shown, that only in neutral solution, does the stearopten possess its characteristic mint-like odor, and any change in this characteristic, must necessarily indicate some change in chemical composition.

yellow oil of grateful odor and constitutes about two-thirds of the volatile oil. It has a pungent, cool, aromatic, and finally, sweetish taste. Desiccated over fused calcium chloride and then distilled, it fractions very irregularly. The first fraction (*a*) very small in quantity, came over at from 180° to 200° C., the second (*b*) at from 200° to 203° C., the third, the largest in quantity, at from 203° to 206° C., the fourth (*d*) at from 206° to 209° C., the fifth (*e*) at from 209° to 211° C.; leaving in the retort a small yellowish-brown residue. Repeating the distillation, after having reunited the more abundant fractions, there was obtained a portion boiling at from 204° to 206° C. (not corrected). This fraction constitutes a perfectly colorless, mobile liquid, lighter than water, having the odor and taste before mentioned, and when subjected to ultimate analysis, gave H 12·00 and C 77·66; while the portion boiling at from 209° to 211° C., yielded H 12·19 and C 77·48. This points to the elementary formula $C_{10}H_{18}O$, isomeric with borneol, which, in 100 parts contains H 11·68 and C 77·92. The portion boiling at from 204° to 206° C. corresponds better, in its results, with this formula, while the higher boiling fractions probably contain compounds less carburetted, and inversely.

The determination of the vapor density was made by Meyer's method, upon the portion boiling at from 204° to 206° C., and conduced to the formula $C_{10}H_{18}O$, but the substance decomposed at the temperature at which the vapor density was taken.

The Action of Sodium upon the Elæopten (*Diosmelæopten*), resulted in the formation of a brownish decomposition product. The addition of sodium was continued until decomposition ceased and water was then added. The brown semi-solid decomposition product was separated from the liquid by filtration through wetted paper. The filtrate was agitated with ether, then treated with more sodium, and acidulated with hydrochloric acid, which separated an oil having a thymol-like odor. It was extracted with ether, and the solvent evaporated spontaneously, when it distilled at from 225° to 238° C., and on fractioning the greater part boiled at from 230° to 232° C. This portion constitutes a light yellowish liquid, very dense, of the odor and taste of thymol and whose aqueous solution (it is slightly soluble in water) does not become colored on the addition of ferric salts. A combustion of this substance, gave H 9·62 and C 77·54, which points to the formula $C_8H_{12}O$, having in 100 parts H 9·67 and C 77·42. The determination of the vapor density by Mayer's process, led to the same formula.

The composition of this liquid, which has phenol-like qualities, would seem to indicate that it is a homologue inferior to ordinary camphor and until its true chemical character is better understood, it is proposed to name it dioscamphor.

Examination of the Stearopten (Diosphenol of Flückiger).—The crude stearopten, as previously obtained, was depurated from adhering brown oil by compression between dry paper and then crystallized repeatedly by dissolving in the smallest possible quantity of alcohol, then lightly heating, adding water, slowly, until a slight turbidity ensued, and cooling, when long, white, needle shaped crystals are formed, having a camphoraceous odor. Heated to 82° C. they sublime, partially, and commence to boil at about 220° C., when decomposition ensues. The diostearopten is slightly soluble in water, very soluble in alcohol or ether, and *in neutral solution*, has a mint-like camphoraceous odor. The alcoholic solution treated with ferric chloride, was tinged an apple-green and then, on the addition of more of the reagent, deepened into a bottle-green color. The hydrates of potassium and sodium dissolve it well, and from their solutions hydrochloric acid precipitates it in minute crystals. Carbonate of ammonium does not dissolve it. It acts, then, like a compound of phenol origin.

The analyses made give different results from those obtained by Flückiger, viz:

	Obtained.		Theory.	
			(*F.*) $C_{14}H_{22}O_3$	(*S.*) C_5H_8O.
H	9·79	9·85	9·24	9·52
C	71·65	71·44	76·58	71·44

Apparently, then, the buchu camphor is much more simple in its chemical structure, than the results of Flückiger would seem to indicate, it appears to be nothing more than an oxycamphor $C_{10}H_{16}O_2$. This product is perfectly identical in all the characteristics published concerning the diosphenol of Flückiger.

The determination of the vapor density, does not tend to establish the formula at $C_{10}H_{16}O_2$ as the substance was decomposed during vaporization, but, in the future with more time and material, correct results will be sought for through another method, and the chemical relation will be ascertained between the diostearopten $C_{10}H_{16}O_2$ and the liquid compound $C_8H_{12}O$. The former is probably a phenylic ether containing, also, one phenol hydroxyl.

Certain other compounds isolated, with alcohol, from the leaves after

the separation of the volatile oil, will also be investigated. One of these substances called *diosmin*, differs completely from the diosmin of Brandes, but may, perhaps, be identical with the diosmin of Landerer, although obtained by a new method of extraction.

AN ANALYSIS OF THE UNDER-GROUND PORTION OF PHLOX CAROLINA.

By Henry Trimble.

Read before the American Pharmaceutical Association in Providence, R. I.

This investigation was undertaken by Mr. S. M. Harrington, a student in the laboratory of the Phila. Coll. of Pharmacy, but after doing some of the preliminary work he had to relinquish it, and with his permission I began the investigation anew.

The scheme proposed by Dragendorff was used as the basis of the work, and I wish to state, in connection with this, that considerable objection has been offered to this method of plant analysis, as being too mechanical and only the blind following of another's plan. I reply that, when there is any reasonable ground for such criticism, it is the fault of the chemist doing the work and not of the method. A scheme of some kind is obviously necessary, and immensely better than a fragmentary examination for an alkaloid, glucoside, or some other new compound, without first determining all the important constituents. The method of Dragendorff has been found to be the most satisfactory of a number that have been offered, and the results will always show originality if that faculty has been exersised. The objection is as absurd as to question the analysis of a mineral by the use of hydrochloric acid, sulphuretted hydrogen and the other group reagents.

The following summary of results will afterwards be taken up in detail:

Moisture,	7.82	per cent.	
Ash,	16·70	"	
Camphor with red coloring,	1·00	"	Sol. in petroleum spirit.
Resin,	·44	"	" " stronger ether.
Tannin,	1·82	"	Soluble in absolute alcohol, 9·96 per cent.
Glucose,	·27	"	
Saccharose,	·78	"	
Undetermined,	7·09	"	

Gum,	2·34	per cent.	Soluble in water, 8·68 per cent.
Glucose,	·33	"	
Allied Sugars,	1·49	"	
Albuminoids,	4·52	"	
Albuminoids sol. in dilute alkali,	·99	"	
Calcium Oxalate,	2·90	"	Sol. in dilute hydrochloric acid, 10·86 per cent.
Gum,	·36	"	
Undetermined,	7·60	"	
Volatile Acid, Butyric,	trace.		
Lignin,	5·53	"	
Cellulose and allied substances,	36·65	"	
Total,	98·63	"	
Less calcium oxide in calcium oxalate,	1·19	"	
	97·44		
Loss,	2·56	"	
Total	100·00	"	

Of all these different portions, that soluble in petroleum spirit is the most interesting. The solution was red and fluorescent, and on evaporating the solvent the residue separated in fern-like masses of crystals on the side of the vessel, while that in the bottom formed into star-like circular masses of acicular crystals. These crystalline forms disappeared to a great extent on removing the mother liquor. The dry residue was treated with 66 per cent. alcohol to remove the red coloring matter, and the residue thus purified was crystallized three times from 95 per cent. alcohol, by using it boiling hot, and then twice from absolute alcohol, which left the compound in white, opaque, warty crystals in the bottom of the beaker, and the fern-like crystals on the side. The finest crystals were gotten by allowing the hot 95 per cent. alcoholic solution to cool slowly.

Fig. 1 shows such a crystallization in the bottom of the dish made up of a compact mass of acicular crystals supporting one another with the radiating growth around the base. Fig. 2 shows the same on the side of the vessel.

Physical Properties.—This compound has a slight aromatic odor but no taste, it is readily dissolved by chloroform and ether in addition to the above mentioned solvents. Its melting point was found to be 155·4° C. although further purification may alter this figure slightly. On heating a little above its melting point it sublimes. A transparent crystal causes a beautiful play of colors with polarized light.

Chemical Properties.—On heating above the melting point it ignites

and burns with a smoky flame. Bromine dissolves it readily exhibiting considerable chemical activity but very little heat. Concentrated sulphuric acid dissolves it with a brownish color, strong nitric acid slowly acts on it without decided coloration, and glacial acetic acid dissolves it readily, and from this solution water precipitates it. This

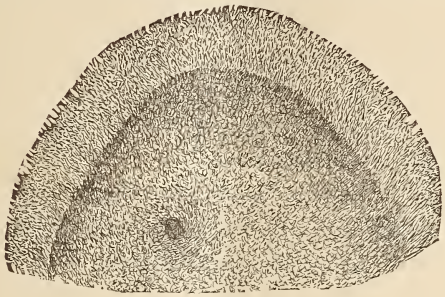


FIG. 1.

may prove to be a valuable method of purification. Concentrated solutions of the alkalies appear to have no effect.

In view of all these properties, this compound is considered to belong to the camphor group, and according to the custom of naming, *Phloxol* is suggested to designate it.

Spigelia was also also treated with petroleum spirit, but no such compound was obtained; this solvent, therefore, immediately suggests itself

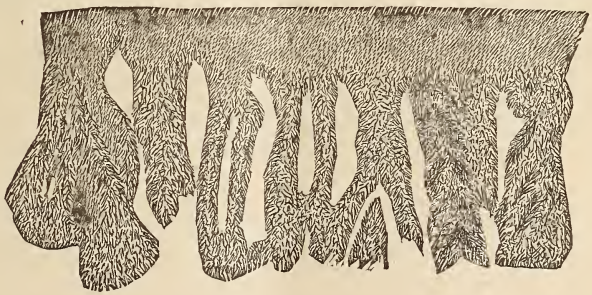


FIG. 2.

as a means of distinguishing spigelia from phlox. For the two drugs in the normal condition the physical appearance is sufficient. The fluid extracts or other liquid preparations could not thus be distinguished, because dilute alcohol which is employed as the solvent does not dissolve the camphor. It might, however, be used to distinguish the powders or mixtures of them.

I regret that the results of an ultimate analysis could not be included in this description. This, however, is reserved for another paper, because there have been discovered during the past year, in the same laboratory, two other new crystalline compounds which closely resemble this; one, in a bark from Honduras, by Mr. F. Holberg, for an account of which see AMER. JOUR. PHARMACY, May, 1886. The other was likewise discovered in a Honduras drug by Miss Helen C. D. Abbott, and an account of it read by her before the American Association for the Advancement of Science at its recent meeting in Buffalo. These three interesting compounds will be made the subject of another paper.

The ether soluble portion contained a small quantity of the red coloring matter which was found with the camphor. On evaporating the ethereal solution to dryness and treating with water, a solution was obtained which gave no indication of the presence of alkaloids or glucosides, but, on evaporation over sulphuric acid, a minute quantity of crystals formed which were not further examined.

That portion of the original drug which dissolved in absolute alcohol was found, after evaporating the solvent, to be completely soluble in water. It amounted to 9·96 per cent., of which 1·82 per cent. was tannin, 1·05 per cent. sugar and 7·09 per cent. undetermined. A separate determination of the tannin in the original drug by the gelatin and alum process confirmed the estimation of that substance. This tannin was found to be of the variety which forms with salts of iron a green color. The remaining solvents did not dissolve anything of especial interest.

Fifty grams of the original drug were distilled with milk of lime, but tests applied to the distillate showed the absence of a volatile alkaloid.

Another quantity distilled with dilute sulphuric acid furnished a distillate acid in reaction and unaffected by barium chloride or neutral lead acetate, but forming a white precipitate with basic lead acetate. The remainder of the distillate was treated with slight excess of pure barium carbonate, evaporated to small bulk and set aside over sulphuric acid to crystallize. The result was a small amount of crystals of the barium salt, which, on treatment with concentrated sulphuric acid, gave an odor strongly resembling butyric acid. This was not further examined as the amount present could not be considered more than a trace.

GUARANA, METHODS FOR ITS ASSAY, AND THE ASSAY OF ITS FLUID EXTRACT.[1]

By H. W. Snow, Ph.C.

In the Amer. Jour. of Phar., 1875, p. 135 is a method, proposed by E. S. Wayne, for the extraction of caffeine from tea and coffee, with the remark that it yielded very high results of a pure white alkaloid. Later on, F. V. Greene (Amer. Jour. Phar., 1877, p. 337) applied the process to guarana, as a method of assay. J. H. Feemster (Proc. A. P. A. xxx., p. 569) more recently, has also recommended this method as a practicable assay process, and suited for pharmaceutical purposes. The criticism which the writer would offer upon it is chiefly the length of time required to complete the operation, but also as compared with the process to follow gives lower results indicating a less perfect exhaustion of the drug. In the boiling with litharge, several hours are consumed, which followed by filtration, washing, removing the lead, etc., extends the examination over the greater part of two days, and occasionally longer, and requiring considerable attention during the whole of that time. Any process then which can be begun late in the afternoon of one day, and finished easily in four or five hours the next day, would, all other things being equal, recommend itself to all who are engaged in making a number of pharmaceutical assays each day, but particularly would it be desirable when along with rapidity, we get a more perfect exhaustion of the drug. The process which the writer has to suggest is not new, except in its application to this drug, being the same as that proposed by A. B. Lyons, for the assay of nux vomica (Drug. Cir. 1886, p. 137) and which as applied to this drug is briefly described as follows:

Place five grammes of the drug in a small flask holding about 100 cc. or 120 cc., introduce 44 cc. of chloroform, cork and shake, then add 6 cc. of a mixture of alcohol, 6 volumes, and stronger water of ammonia 1 volume, again shake vigorously, and set aside with frequent shaking during several hours or allow to stand over night. Then filter rapidly through a small dry filter paper, four inches in diameter, and receiving the filtrate in a vessel graduated to 40 cc. (corresponding to 4 grammes of drug), evaporate the chloroform and treat the residue with a little water and filter through cotton, after-

[1] Presented to the Amer. Pharm. Assoc., in Providence, September, 1886.

wards passing the liquid through an ordinary filter and using the wash water of the first filter as wash water for the second filter. The washing should be continued until they cease to precipitate with phosphomolybdic acid. The operation of filtering and washing does not take much time and if the cotton filter cloggs, it is easy to stir up the insoluble fatty or waxy matter, so as to permit the liquid to pass through. The aqueous liquid, which will usually measure 40 cc. to 50 cc. is next placed in a separator and washed with successive portions of chloroform, or until the aqueous liquid ceases to precipitate with phosphomolybdic acid. Two washings are generally sufficient, though the writer always applies the test before discontinuing the washing, and in fact it is always better for the operator, wherever possible, to assure himself by some such a test, that the alkaloid is all contained in the liquid supposed to contain it. The chloroform solution is now evaporated in a weighed beaker, and the residue dried at 100° C. for half an hour, cooled and again weighed. The weight in grammes multiplied by 25 gives the percentage of alkaloid. This process gives somewhat higher results than that of Greene, which in a sample of guarana showed 4.14 per cent., duplicate 4.28 per cent. The same drug assayed by the same process, showed by four different assays, 4.64 per cent. 4.66 per cent. 4.84 per cent. and 4.89 per cent. of caffeine. The writer also tried Prollius' fluid for the assay of cinchona barks, but without success. The same drug, as above, showing only 3.97 per cent. of alkaloid. In general, ether is not so well suited for the extraction of caffeine, as either benzol or chloroform, owing to the comparative insolubility of the alkaloid in that menstruum. Ammoniated ether and ammoniated chloroform were both tried for the extraction of caffeine from cola nuts yielding in the one case 1.34 per cent. and in the other 1.45 per cent of alkaloid, which did not, however, seem in such a pure condition as in the case of guarana.

In "The New Idea" the writer gave the results of a number of assays of fluid extract of guarana, which will probably be of interest here. The process employed was practically as follows: Evaporate 5 cc. of the fluid extract to dryness, with about one ounce of litharge powder, introduce into a flask of about 120 cc. to 150 cc. capacity, and pour in 100 cc. of chloroform, and shake repeatedly during three or four hours, and finally filter through a dry filter, containing some magnesia, which removes suspended particles of insoluble matter, which would be difficult to remove without some such device as the

magnesia. 80 cc. of filtrate (corresponding to 4 cubic centimeters of the fluid extract) are then evaporated to dryness, dried one half hour at 100° C., cooled and weighed. The weight in grammes, multiplied by 25, gives the percentage of the alkaloid extracted from the drug, and this percentage, divided by the specific gravity of the fluid extract, gives the percentage in the latter. The above gives results agreeing with those obtained in the same fluid extract by using Greene's methods slightly modified. Applying the above process to a number of commercial fluid extracts, results were obtained as shown in the following table:

No. of Sample.	Sp. Gravity.[1]	Per cent. of Alkaloid extracted from the drug.	Per cent. of Alkaloid in the fluid extract.	Grains of Caffeine in each fluid ounce.
1.....	1.0227.	2.70.	2.69.	12.35.
2.....	1.0182.	2.75.	2.70.	12.55.
3.....	0.9587.	2.72.	2.84.	12.44.
4.....	0.9947.	2.93.	2.94.	13.36.
5.....	0.9536.	2.99.	3.13.	13.67.
6.....	1.0409.	3.57.	3.42.	12.29.
7.....	0.9848.	3.40.	3.45.	15.51.
8.....	0.9797.	3.52.	3.60.	16.08.
9.....	0.9508.	3.70.	3.89.	16.88.
10[2].....	1.0515.	4.85.	4.61.	22.13.
Average..	0.9856.	3.31.	3.33.	15.03.

"The National Dispensatory" (3rd edit. p. 366) credits E. Hosack, (1883), (the writer has not been able to consult the original paper) with the statement that commercial fluid extracts of guarana yielded only 1.10 per cent. to 1.68 per cent of caffeine, while it will be seen that the average of the above fluid extracts is 3.33 per cent. or practically, double the highest estimate given by Mr. Hosack. The experiments of J. H. Feemster, already referred to, show that guarana

[1] Specific gravity was taken at the temperature of the work room (26° C.) compared with water at the same temperature.

[2] This was a fluid extract which had evidently been standing for a considerable length of time in a nearly empty bottle, which probably accounts for its unusual strength.

assays on an average 4.32 per cent. so that the above fluid extracts fall considerably short of perfect exhaustion of the drug.

Later the writer has sought a process which should be more economical as regards time and chloroform, which in the process as originally applied requires considerable amounts. It suggested itself that the well-known power of slaked lime in removing organic matter from solution might be applied with good effect, and as a result the following process was found most satisfactory: 15 cc. of fluid extract are placed in a small flask, 30 cc. of distilled water are added and the mixture shaken up with two grammes of slaked lime, filter through a small dry filter paper, four inches in diameter, and taking 15 cc. of the filtrate (corresponding to 5 cc. of fluid extract) neutralize with a few drops of dilute sulphuric acid, avoiding an excess and evaporate to dryness, digest with a little water, filter, wash until the washing ceases to precipitate with phosphomolybdic acid, make alkaline with ammonia, wash with chloroform three times and evaporate etc., etc. This last method gives higher results than the first method given, and corresponds more nearly with the ammoniated chloroform process for the drug. The above processes all yield the alkaloid in a pure white mass, and though as yet no definite experiments have been performed to show that it is wholly alkaloidal, there seems little or no doubt that the mass is so.

Experiments to prove that this is absolutely the case, must be reserved for a future paper.

ON THE DETERMINATION OF MELTING POINTS.

By Henry C. C. Maisch.

Read before the American Pharmaceutical Association, in Providence, R. I.

A pharmacist has many compounds of different properties to work with. A method for the determination of melting points used with one of these compounds may work well, while it can be used for few others. We must, consequently, adapt the method to each subject under consideration; thus phosphorus could be melted under water, but not on mercury, while the different camphors may be melted on the latter. From these remarks it can easily be seen that the best manner of treating the subject of melting points would be to class those articles together whose melting points could best be determined by the same methods. The headings under which I propose to con-

sider the different methods are as follows: Class I. Camphors, resins, waxes and alkaloids; Class II. Fats; Class III. Substances not readily oxidized; Class IV. Substances easily oxidized in contact with air.

Class I. *Camphors, resins, waxes and alkaloids.* A convenient and practical method, which I would advise being used for this class is the following: A small beaker is filled two-thirds full of mercury, into which a thermometer is suspended so that the mercury just covers the bulb of the thermometer. A small quantity of the article under examination is placed directly on the mercury and kept as close to the thermometer as possible. Heat is then gradually applied so that the rise of the mercury in the thermometer does not exceed two or three degrees, Fahrenheit, a minute. When the first indications of melting are visible, note the number of degrees and carefully regulate the heat so as to keep the temperature stationary at this point for a little time to see if the whole quantity will melt. If the article under examination does not melt completely, again apply heat very carefully until the whole quantity is melted to a transparent liquid. The temperature at which this takes place may be regarded as the melting or fusing point near enough for all practical purposes, though if greater accuracy is required it is first necessary to examine a body with a known melting point under the same conditions as are those when examining the body with the unknown melting point. We obtain thus the ratio of variation in this particular instance, and the required melting point can then easily be obtained from the given data. This comparison can be used in all subsequently named classes.

Class II. *Fats.* The above method can be used here also, but it will not give such satisfactory results as the following: A small, thin-walled glass tube is drawn out very fine, and the melted fat then sucked up into the tube, the capillary portion of which is then melted to a point. The part to be used is then laid aside for two or three days in a cool place. The tube is then attached to a thermometer by means of a rubber band, in such a manner that the capillary portion is as close to the bulb of the thermometer as possible. The apparatus is now placed so that the liquid, either water or sulphuric acid, just covers the bulb of the thermometer. Now gradually apply heat, being careful about the rise of the mercury in the thermometer. The melting point is that degree at which the fat becomes transparent. Another method is to have the capillary tube open below, and noting

the temperature at which the fat is pressed upward in the tube. This latter method does not give as accurate results as the former, some fats becoming very soft before they are entirely melted; but it can be used to good advantage in the determining of the melting points of some resins and waxes.

Class III. *Substances not readily oxidized.* The method given under Class I. can be used here, but only in such cases where no reaction takes place. Where this method cannot be used, we must resort to the sand-bath and a thin porcelain capsule. The temperature registered by the thermometer, if placed in the sand-bath, will be several degrees too high; as a correction we can use the comparison mentioned under Class I. Or the bulb of the thermometer is immersed in the material, which is slowly heated to liquefaction.

Class IV. *Substances easily oxidized in contact with air.* Sulphur, phosphorus, and other bodies which easily burn or oxidize, or in which there takes place dissociation or other chemical change when heated in air, must be melted in some liquid in which the article under examination is not at all or only very slightly soluble, and with which no chemical decomposition takes place. The best manner in which to apply this method, is to suspend a piece of the substance in the liquid, and keep the bulb of the thermometer as close as possible to it. This .method has been tried by Gerardin (*Compt. rendues*, 1862, liv, 1082) with sulphur and phosphorus in different media, and he found the melting point to be invariably 111.5° C and 44.2° C respectively.

At various times descriptions of apparatuses for the determination of melting points have been published, of which the following may be briefly mentioned. Dragendorff (Analyse der Pflanzen 12, 13) does not apply heat directly to the beaker spoken of under Class I. He allows the rim of the beaker to rest on the top of a filter-dryer and covers the whole with a bottle, the bottom of which has been taken out. The thermometer is suspended through the neck of the bottle, and is there fastened by a cork. The whole apparatus stands on an iron plate, the filter-dryer being of such a height that the beaker does not rest on the plate. Heat is now applied gradually to the iron plate, carefully regulating the temperature.

Another form of apparatus has been described by Gustav Oldberg (Rep. d. Anal. Chem., 1886, 94). The apparatus consists of two glass tubes of different diameters; a bulb is blown into one end of

the narrower tube, and the tubes are then connected above and below with each other by two glass tubes, the upper one being the widest and being attached somewhat slanting. The apparatus is then filled with water or some other liquid, so as to almost fill the upper connecting tube; a thermometer, with the subject under examination in a fine glass tube, is then adjusted so that the bulb of the thermometer is in the bulb of the apparatus. The liquid in the apparatus is then heated gradually in the wide, upright glass tube.

Authors differ very much in regard as to which point shall be taken as the melting point. F. Rüdorff (Pogg. Ann., 1870, cxl, 420) holds that the congealing and melting points are identical, and that the temperature at which the substance congeals shall be regarded as the melting point. Other authors opposed to the foregoing, hold that the congealing and melting points of certain bodies are at different temperatures.

In conclusion, I would like to make a few remarks as to the value of the melting points given in the Pharmacopœia. Melting points should not be given in the Pharmacopœia except in such cases where they are necessary for establishing the quality of medicinal articles, for example, acidum aceticum glaciale, oleum theobromæ, petrolatum, etc; the melting points of the various alkaloids and several other articles not being useful for this purpose, are entirely out of place. The Pharmacopœia should state the general effect of heat if characteristic for the drug; but it should only contain such melting points as will be necessary for testing the purity of the material, and all the rest should be left where they belong, viz, the text books.

ULEXINE. A NEW BASE FROM ULEX EUROPÆUS.

By A. W. Gerrard, F.C.S.,
Teacher of Pharmacy, University College.

One of the most familiar plants in England is the leguminous shrub known to botanists as *Ulex europœus*, and to the country folk by the names furze, gorse, whin, etc. It is conspicuous on commons and roadsides, and is well known by its spiny branches and bright yellow flowers, either solitary or in pairs, situated on the spines.

The economic uses of the plant do not seem to be important. It is chiefly grown to provide shelter for young trees or cover for game; in some parts of the country the young tops are gathered and bruised as fodder for cattle. The seeds, which are an article of commerce, recently attracted my attention.

Twenty grams of the crushed seed was first exhausted with washed ether, to remove fat, and on evaporation 2·1 grams of greenish-yellow oil of bland taste was obtained. The seed was then exhausted with 84 per cent. alcohol, the tincture giving on evaporation 1 gram of brittle, pale greyish-green resin. On treating this residue with water and filtering, the filtrate was found to give precipitates with solutions of iodine in iodide of potassium and of the double iodide of potassium and mercury. The bulk of the liquid, after concentration, was shaken with ammonia and chloroform, and the residue obtained on evaporating the chloroform proved to be an organic base, for which I propose the name "ulexine."

To prepare a larger quantity of the base I operated upon 3 kilos of furze seed crushed to fine powder, moistened with 84 per cent. alcohol, closely packed in a percolator and slowly exhausted with a further quantity of alcohol. The percolate on distillation gave a residue of oily-looking green extract, having the appearance of extract of male fern, and like it giving a deposit; the yield was 270 grams. This extract was repeatedly shaken with hot water until the oily matter seemed exhausted of alkaloid; the insoluble portion was set aside for future examination. The watery solution, carefully evaporated to 250 cc. and allowed to cool, was then mixed with excess of ammonia, and shaken with several portions of chloroform; the chloroform solutions left on distillation a brown syrupy residue containing the base. For the purpose of purification, it was made neutral with hydrochloric acid; the product almost immediately solidified to a mass of crystals, which were washed with absolute alcohol to remove coloring matter. A further treatment with ammonia and chloroform gave the pure base as a compact crystalline mass weighing 4·3 grams, being a yield of ·143 per cent. calculated on the seed. Since the above experiment was made, I have found that much alkaloid was left in the residue, and its complete removal will form the subject of another communication.

Ulexine forms colorless, odorless crystals, with a bitter and somewhat pungent taste; it is freely soluble in water, forming a strongly alkaline solution. Heated, it fuses, darkens and decomposes, giving off vapor that burns with a yellow smoky flame, and leaves no residue. Small portions placed on watch glasses gave, with nitric, hydrochloric, hydrobromic, sulphuric and oxalic acids, in a few hours, well crystallized salts. The salts appear to be freely soluble in water,

very strong solutions of them giving precipitates with caustic potash and soda soluble in excess, but they give no pricipitate with ammonia.

Ten per cent. solutions of the carbonates of potassium, sodium and ammonium, or of the iodide, chromate and ferrocyanide of potassium give no precipitates; permanganate of potassium is almost immediately reduced by it. Picric acid gives a yellow precipitate; chromic acid no precipitate. Brought in contact with strong nitric, sulphuric or hydrochloric acids no reaction is apparent.

The watery solution of the pure base gives a green precipitate with ferrous sulphate, a black precipitate with mercurous nitrate, and a white precipitate with mercuric chloride.

From a few experiments carried out in the physiological laboratory of University College, I am able to say that ulexine acts on frogs as a paralyzing agent, causing clonic spasms; placed on the tongue the chloride produced a slight numbness similar to, but not nearly so powerful as cocaine. Knowing that many animals feed readily on the furze plant, it may be inferred that the alkaloid is not of a powerful or poisonous nature; but this idea must not be too hastily accepted, until we obtain precise evidence as to its action, for we know that some poisonous plants are eaten by animals without ill effect. It must be remembered that my observations have been confined to the seed; it yet remains to be proved whether other parts of the plant contain the same active principle, and I am continuing my work in that direction —*Phar. Jour. and Trans.*, Aug. 7, p. 101.

GLEANINGS FROM FOREIGN JOURNALS.

By Geo. H. Ochse, Ph.G.

Assay of Cinchona Barks.—After having tried the various processes for assaying cinchona barks since 1879, Kaspar (*Schweiz. Wochenschr. f. Phar.*, 1886, No. 24) comes to the conclusion that success depends on the alkali used to precipitate the alkaloids, the time allowed for subsiding, and the choice of the proper solvent for dissolving the precipitate.

To exhaust the bark some use acidulated water; others use acidulated alcohol; some mix the bark with ammonia or caustic soda and then extract with ether, chloroform, benzol or amylic alcohol; some mix the bark with lime or magnesia and water and evaporate to dryness on a water-bath, then exhausting with the above mentioned solvents. The

following table shows the quantities of different menstrua required to exhaust 10 grams of an 8·8 per cent. succirubra bark:

Water,	1100·00 grams.
" with 1·50 sulphuric acid,	650. grams.
" " " " " and 2·0 glycerin,	350. grams.
Diluted alcohol	150. grams.
Stronger "	90. grams.

In order to hasten exhaustion the bark was mixed with 50 grams of acidulated water and heated by means of a water-bath but the solutions were turbid, then muriatic acid and alcohol were used with much better results. Hydrochloric acid is preferable to sulphuric acid, because an excess can readily be evaporated. Kaspar's method is as follows: Into a flask holding about 150 cc. and connected with a condensing tube are placed 50 cc. of 90 per cent. alcohol, 20 drops of dilute hydrochloric acid and 10 grams of finely powdered bark, the whole heated in a water-bath for 10 minutes, then expressed, the operation repeated with 50 cc. of alcohol and 10 drops of dilute hydrochloric acid, expressed, and treated for the third time with 50 cc. alcohol and expressed—the liquids are mixed, filtered and evaporated—stirring constantly—to 10 grams. To assay the alkaloid Hager uses picric acid; Schmid and Wolfrum mix with marble and evaporate, then exhaust with absolute alcohol; Prollius advises mixing ether, alcohol and ammonia with the powder; Lösch precipitates with a saturated solution of alum and subsequent supersaturation with ammonia, the precipitate is dried and treated with amylic alcohol or chloroform. Mayer uses potassio-mercuric iodide; Flückiger moistens the bark with ammonia, and after the lapse of one hour mixes with milk of lime, when dry it is treated with ether, chloroform or alcohol; Rabourdin precipitates the infusion with caustic potash and extracts with chloroform; Coëytaux extracts with a mixture of 1 volume of amylic alcohol and 3 volumes of benzol. Hager's method yields small quantities due very likely to the solubility of the picrates. By treating calisaya bark according to Schmid-Wolfrum's method 3·575 per cent. of a brown, amorphous mass was obtained, after purification the yield was only 1·96 per cent. Prollius' method appears to be a practical one, but requires too much material to exhaust the bark thoroughly.

Comparative tests made according to these methods gave the following percentages: Hager, 1·65 per cent.; Schmid-Wolfrum, impure,

3·575 per cent., pure, 1·96 per cent.; Prollius, one extraction, 1·680 per cent., two extractions, 1·950 per cent, three extractions, 2·030 per cent.

Lösch and Flückiger's methods and all those requiring much heat yield small percentages. Coëytaux's method also yields a small percentage. Mayer's and Rabourdin's methods give the most satisfactory results. In Rabourdin's, however, a 10 per cent. caustic soda was substituted for the caustic potash and repeated extraction with chloroform. From 10 grams of succirubra bark, treated as before mentioned with hydrochloric acid and alcohol, the yield according to the different methods was as follows:

Coëytaux	0·515 grams.
Lösch	0.565 grams.
Flückiger	0·613 grams.
Rabourdin	0·840 grams.
Mayer	0·882 grams.

Kaspar's modification of Rabourdin's process is as follows: 15 grams, 10 per cent. solution caustic soda, 10 grams of the fluid extract and 15 cc. of ether are mixed in a tube 30 cm. long and 2 cm. wide. The mixture is shaken frequently and allowed to stand one day, the ethereal layer is removed with a pipette and the operation repeated twice more, using in each instance 15 cc. of ether. The ethereal solutions when mixed, filtered and evaporated yield besides traces of other bases, the crystalline and amorphous quinine. The alkaloids, which are insoluble in ether, are extracted in the same way as the quinine, using 15 cc. of chloroform in each operation. The filtered chloroformic solutions are evaporated and the residue figured as quinidine, cinchonine and cinchonidine.

Syrupus Althææ.—A stable syrup of althea can be prepared by filtering the infusion on the sugar, then boiling. Marshmallow syrup, when thus prepared, is of a very light color and keeps even during the summer months.—*Pharm. Zeitung*, 1886, p. 449.

Austrium, a new element.—Edward Linnemann, professor of chemistry at the University of Prague, found in *orthite*, of Arendal, a mineral rich in rare metals, a new element, to which he gave the name of austrium, symbol *Aus.* The solutions of *orthite* must first be freed from the rare metals by ordinary methods, and the iron nearly all precipitated as oxalate, then treated with hydrogen sulphide which precipitates most of the lead, copper, tin and arsenic.

After filtering, the solution is exactly neutralized and an alkali acetate is added, when treated with sulphuretted hydrogen or sulphydrate of ammonium it still yields a precipitate, and on exposure to the air, austrium with other metals is precipitated. The spectrum of austrium is characterized by two violet lines, the more intense one being near D which is the principal one for potassium, the other is a little further distant. Austrium is separated from zinc with great difficulty. Jungfleisch and Lecoq de Boisbaudran believe it to be identical with gallium. Certain reactions of oxide of austrium, for instance, its solubility in caustic alkalies and its adherence to zinc sulphide when precipitated, are identical with gallium.—*Jour. de Phar. et de Chimie*, xiv, p. 41.

Butter tests.—Liebschütz saponifies the butter with barium hydrate and extracts the glycerin with stronger alcohol, filtering and then evaporating at 100° C. Pure butter yields 3·75 per cent. glycerin, artificial butter, 7 per cent.—*Phar. Zeitschr. f. Russland*, xxv, p. 397.

Iodol Gauze is prepared by saturating gauze in the following solution: R. iodol 1, resin 1, glycerin 1, alcohol 10.—*Schweiz. Wochenschrift*, xxiv, p. 275.

Hydrochloric Acid free from Arsenic is obtained by macerating copper shavings in the acid for 36 hours, decanting and redistilling. According to Hager, chloride of iron and chloride of tin do not yield satisfactory results, as more or less of these salts is found in the distillate.

Preservation of Salicylate of Sodium.—If crystallized or powdered salicylate of sodium is placed in a glass vessel and exposed to the light for about 4 or 6 weeks it darkens, loses its acid reaction and forms dark solutions, whilst the same, protected from light, remains colorless and preserves its reaction. Salicylate of sodium is also affected by moisture; when kept in perfectly dry bottles and sheltered from light no change is produced, but when kept in paper it soon becomes gray and inert. Solutions of salicylate of sodium made with spring-water soon darken, but when made with distilled water no change occurs.—*Nouveaux Remèdes*, ii, 379.

Naphthalin Leaves for exterminating Moths are prepared by melting together carbolic acid and ceresin each 1 part, naphthalin 2 parts, and painting on sheets of unglazed paper.—*Phar. Rundschau, Prag*, xii, p. 594.

Characteristic Reaction between Apomorphine and Cocaine.—When

a dilute solution of apomorphine is added to a dilute solution of cocaine hydrochlorate a green coloration is produced. The reaction takes place in several minutes and being very delicate can be used as a reagent.—*Phar. Rundschau, Prag,* xii, p. 614.

Knodalin.—A mixture highly recommended for the destruction of all kinds of vermin on plants consists, according to Barenthin, of 2 to 3 grams nitrobenzol, 10 grams xanthogenate of potassium, 400 grams potash soap, containing about 60 per cent. of water, and 600 grams amylic acohol. Knodalin is a reddish-brown, oily liquid, having an alkaline reaction and a strong order of amylic alcohol.—*Archiv der Pharm.* 1886, xiii, p. 673.

Characteristic Reaction for Codeine.—By rubbing a small quantity of codeine with two drops of a solution of hypochlorite of sodium on a watch crystal and adding four drops of concentrated sulphuric acid a beautiful sky-blue color is produced. This reaction is characteristic for codeine, as no other alkaloid is known to produce the same reaction.—*Phar. Centralhalle,* xxvii, p. 321.

Potassium ferraté.—C. L. Bloxam states that ferrate of potassium can be made in a short space of time by dissolving a piece of caustic potash in a small quantity of solution of chloride of iron, adding several drops of bromine and warming slightly. The resulting dark brown mass is soluble in water, forming an intense red solution. Barium chloride yields a heavy purple-red precipitate of barium ferrate, the solution becoming colorless. A beautiful red solution of ferrate of calcium is obtained by treating chlorinated lime with ferric chloride and boiling with water; filtering through paper destroys the color. The rose-red color frequently noticed when boiling solutions of chlorinated lime is due to the formation of ferric chloride. —*Chemiker Zeitung,* x, p. 178.

Dr. Magitot's Toothache Drops consist of chloroform, tincture of opium and creasote of each 2 grams, tincture of benzoin 6 grams.—*Les Nouveaux Remèdes,* ii, p. 338.

A new and characteristic reaction for Gold.—To several drops of a dilute solution of chloride of gold is added several drops of a solution of arsenic acid, 2 or 3 drops of solution of ferric chloride and 2 or 3 drops of hydrochloric acid, the whole diluted with 100 cc. of water. When a piece of zinc is thrown in the mixture the liquid immediately around the zinc assumes a purple color, and when agitated the color is distributed to all the liquid, and remains for half

an hour. This reaction is very delicate even in solution of 1:1000,000. The color disappears at once when the mixture is shaken with zinc dust. If no hydrochloric acid is added a purple precipitate consisting of double arseniate of iron and gold is produced. If phosphoric acid is used in place of arsenic acid a violet or blue coloration results.—*Phar. Centralhalle,* xxvii, p. 321.

THE ANALGETIC ACTION OF CARBOLIC ACID AND THE CRESOL GROUP OF COMPOUNDS.

By Dr. R. McNeill.

Dr. NcNeill has made some experiments on himself and others with carbolic acid and the cresols to determine whether their local anæsthetic influence can be utilized. He finds that a mixture of sixty parts of acid and forty of oil renders the skin of the arm insensitive to pain caused by superficial incisions. It produces, however, a sensation of heat, but this can be removed without any interference with the anæsthesia by the application of glycerin.

A mixture of glycerin and acid will have the same effect as the oil and acid, but only if twenty per cent. stronger. Impure carbolic acid having appeared more effective as a local anæsthetic than the absolute phenol, Dr. McNeill tried the effect of several of the substances allied to carbolic acid which are produced in the distillation of coal. Several of these, as benzol and toluol, had no effect. A mixture of ortho- and para-cresol (sold as cresolene) was found to have a similar effect to carbolic acid, but was not so powerful. Paracresol, on the other hand, acted more powerfully, equal parts of this substance and oil producing anæsthesia.

It is worthy of note that whilst analgesia is produced the sensation of touch remains, and that the deeper parts may be opened painlessly by introducing some of the anæsthetic compound into the tissue laid open.

Dr. McNeill records some cases in which he performed minor operations without pain by the aid of carbolic acid or cresol. No sloughing or other trouble followed their use.

As a mixture of glycerin and carbolic acid is a less powerful corrosive than a mixture of oil and acid, Dr. McNeill suggests that glycerin should be administered in poisoning by carbolic acid instead of oil.—*Med. Chronicle,* July, 1886; *Edinb. Med. Jour.,* June.

PTOMAÏNES AND LEUCOMAÏNES.

By A. Gautier.

The author gives a *résumé* of the work done on these alkaloids. From the muscle of large animals, he has succeeded in obtaining five new alkaloids, (leucomaïnes), perfectly definite in composition and crystalline form, which, when administered to animals, act more or less powerfully on the nerve centres, inducing sleep, and in some cases causing vomiting and purging, in a manner similar to the alkaloids of snake poison, but less powerfully than the ptomaïnes. These bases are formed during life and occur in the urine, saliva, venom, and various glandular secretions; but the author has more particularly studied their occurrence in muscle.

Xanthocreatinine, $C_5H_{10}N_4O$, is the most abundant of the bases obtained from muscle. It consists of light sulphur-yellow spangles, with a slightly bitter taste. The crystals are very soluble in water and soluble in hot alcohol. They slowly blue reddened litmus paper and redden the blue paper. The hydrochloride is obtainable. The platinochloride is very soluble, and crystallizes in long sheaves. The aurochloride is difficult to obtain in the crystalline form. The substance closely resembles creatinine. This resemblance, together with its yellow color, is indicated in its name.

Crusocreatinine, $C_5H_8N_4O$, is decidedly alkaline to test-paper, and gives a soluble non-deliquescent hydrochloride, and a soluble platinochloride. The slightly soluble aurochloride occurs in crystalline grains. This base neither precipitates zinc from its acetate nor mercury from its nitrate, but it precipitates alumina from alum solutions. It strongly resembles creatinine.

Amphicreatinine, $C_9H_{19}N_7O_4$, occurs in small quantity only. It is a feeble base, forming a non-deliquescent crystalline hydrochloride. Its platinochloride is soluble in water, insoluble in alcohol, and forms lozenge-shaped plates. Its aurochloride forms very soluble, microscopic, hexahedral and tetrahedral crystals.

Pseudoxanthine, $C_4H_5N_5O$.—The alcoholic mother-liquors from the preceding compounds are freed from alcohol, the residue is taken up with water, and treated with copper acetate in slight excess. On heating, a precipitate is obtained from which the copper is separated by means of hydrogen sulphide. On filtering the boiling solution, a light sulphur-yellow powder is obtained. This substance readily

forms a very soluble hydrochloride. It is similar to xanthine, except that it is slightly more soluble, and there is a little difference in the crystalline form. The author has also obtained two other bases of the composition $C_{11}H_{24}N_{10}O_5$ and $C_{12}H_{25}N_{11}O_5$ respectively, whose reactions show their close relation to creatinine. During the writing of this paper, Brieger has described a very poisonous leucomaïne, of the composition $C_6H_{15}NO_2$, obtained from poisonous mussel, which he calls *mytilotoxine.—Jour. Chem. Soc., July*, 1886, p. 634. *J. Pharm.* [5], xiii, 354–360, and 401–409.

WOOD NAPHTHA.

By C. A. Fawsitt.

After referring to the composition of wood, the author discusses the conditions on which the yield of the different products of wood distillation depends. The species, age, and condition of the wood, as well as the soil it is grown in, affect the yield of the different products. Hard woods are preferred by the wood distiller, oak, beech, and birch being mostly used. The following particulars show the difference in yield of acid for 100 parts of oak and Scotch fir:—

	Crude acid.	Acetic acid.	Tar.	Charcoal.
Oak.....	47·6	5·4	6·4	24·9
Scotch fir.....	45·0	2·7	10·0	28·0

The yield of products is influenced also by the temperature, size, and shape of the retorts. As a rule, a low heat gives more charcoal, acid, naphtha, and tar, but less permanent gas than a high temperature. The aim of the distiller being to obtain the largest possible yield of acid, the heat of the retort is regulated accordingly. It has been found that the most suitable temperature is 350—400°.

In the second part of the paper, the author refers to the preparation, properties, and uses of wood-naphtha. The crude naphtha has a sp. gr. varying from 0·970 to 0·990. It has a dark brown color and strong odor. Besides water, it contains methyl alcohol, acetone, methyl acetate, aldehyde, allyl alcohol, dimethyl ethylidene ether, also small quantities of mono-, di-, and tri-methylamine, ammonium acetate, oils, and tarry matter. As to methods in use for working up the the crude naphtha, that involving distillation by means of lime gives the best product. The lime retains the water and acid, almost entirely decom-

poses the methyl actate and simple and compound ammonias, converts the greater part of the oils into solid resinous bodies of high boiling points, and diminishes the percentage of acetone, which, on treatment with lime, gives condensation-products of high boiling point. In conclusion, the author refers to the composition of the oils present in the crude naphtha.—*J. Chem. Soc.*, 1886, p. 289; *J. Soc. Chem. Ind.*, iv. 319.

NEW CONSTITUENTS OF ATROPA BELLADONNA.

By H. Kunz.

The occurrence of a fluorescent compound in belladonna has been repeatedly noticed. The author has found this compound both in the extract of the root and of the leaves and stalk; the root extract was acidified until all fluorescence disappeared, and then agitated with ether. The brownish-yellow residue left on evaporation of the ethereal solution consisted of miscroscopic prisms having an acid reaction. By washing with cold ether, a non-crystallizable, bitter mother-liquor was separated, which was reserved for further examination. The crystals were purified by repeated treatment with boiling absolute alcohol, which finally yielded small clusters of light yellow, four-sided, highly refractive, rhombic prisms. This substance the author names provisionally *chrysatropic acid*, $C_{12}H_{10}O_5$. It melts at 201·5°, resolidifies at 182·6°. When carefully heated, the acid sublimes without decomposition, but when more strongly heated burns with a luminous flame leaving no residue. It is soluble in 70—80 parts of hot water, sparingly in cold water and in ether, more soluble in alcohol and acetic acid. The concentrated aqueous and alcoholic solutions are pale yellow by transmitted light, but by reflected light show a beautiful emerald-green fluorescence; dilute solutions give a blueish fluorescence. The crystals dissolve in alkalis or alkaline carbonate solutions, yielding splendid blueish-green fluorescent solutions. An aqueous solution when treated with potassium permanganate gives a green liquid showing strong indigo-blue fluorescence. Ferric chloride gives an emerald-green coloration changing to cobalt-blue. The lead and copper salts were examined and described. From the formula and reactions of the substance, the author infers a near relationship to hydroxynaphthaquinone.

Leucatropic acid, $C_{17}H_{32}O_5$, is obtained from the bitter mother-liq-

uor previously mentioned; it crystallizes in clusters of miscropic prisms having a satin-like lustre, it melts at 73·8°, and resolidifies at 60·2°. It is insoluble in cold, but somewhat soluble in boiling water, it is nearly insoluble in cold, but readily soluble in boiling ether and in alcohol. Qualitative examination indicates that the compound belongs to the fatty acid series.

The author also found about 0·6 per cent. of succinic acid in belladonna extract prepared from the herbaceous part of the plant.—*Jour. Chem. Soc.*, 1886, p. 255. *Archiv d. Phar.* [3] *xxiii.*

FORMATION OF OXALIC ACID IN VEGETATION.

By Berthelot and André.

The plants selected and examined at various stages of their growth were *Rumex Acetosa*, *Amarantus caudatus*, *Chenopodium Quinoa*, and *Mesembrianthemum crystallinum*. The juice of the first is always acid, that of the second and third neutral or feebly acid, whilst that of the last is neutral in the early stages of growth, but becomes acid as the plant develops. The plants also differ very considerably in the ratio between the soluble and insoluble oxalates which they contain.

Rumex Acetosa.—The seed or dried fruit contains 0·05 per cent. of oxalic acid. In the early stage of growth (June 8th) the root contains 13·9 per cent. of oxalic acid, 5·1 per cent. being soluble and the remainder insoluble. The proportion of ash is 20 7 per cent., and some of the acid is in the free state. When the plant is in active vegetation (June 26th), the absolute quantity of oxalic acid has increased, but the relative proportion has diminished owing to the development of ligneous tissue and albuminoïds. The total proportion is about 10 per cent., and it is especially abundant in the leaves and limbs, and least abundant in the root, in which it is almost entirely insoluble owing to the proximity of the calcium compounds in the soil. In the limbs, about one-half is in the insoluble condition. The actual acidity is below the total oxalic acid in the limbs, but is higher in the roots and petioles, and hence the latter contain some acid other than oxalic acid. The limbs contain soluble oxalate and soluble calcium salts in almost equivalent quantities, but these must either circulate in different vessels or exist in the form of ethereal

salts or double salts. The existence of soluble oxalates and calcium salts in the same parts of a plant may in fact be explained in three ways. The oxalates may exist in the form of double salts of potassium, calcium, and magnesium, dissociable by water, or the formation of oxalic acid may take place in special vessels, or the oxalic acid may exist in the form of ethereal salts which are ultimately decomposed in contact with calcium compounds.

When the plant begins to fructify (September 27th), the absolute amount of oxalic acid has increased, but in much lower proportion than the increase of the whole plant, so that the percentage amount is only one-fourth of what it was at the early stage of growth. The decrease is most considerable in the roots and limbs. In the former, almost all the oxalic acid is in the insoluble form, whilst in the limbs and petioles the soluble oxalates preponderate. At the same time there is a diminution in the proportion of ash. The calcium is in excess of the oxalic acid in the root, but in the petioles and stalks the reverse is the case. The limbs are rich in soluble oxalates and also in calcium salts.

The leaves of *R. Acetosa* are very rich in nitrogenous substances. They are also the principal seat of the formation of oxalic acid, whereas nitrates undergo destruction in the leaves (*Ann. Chem. Phys.* [6], viii, 41). It would seem therefore that the oxalic acid is a product of the incomplete reduction of carbonic acid. If, however, the ratio of oxygen expired to carbonic anhydride absorbed remains constant, the production of oxalic acid in this way would require the simultaneous production of some highly hydrogenized compound as a compensating reaction. Such hydrogenized compounds are found in the albuminoids which are so abundant in the leaves.

Amarantus caudatus.—This plant contains a considerable proportion of nitrates (*loc. cit.*) and the oxalic acid is mainly in an insoluble form. At the commencement of inflorescence (June 18th) the percentage of oxalic acid was 5·86 or about half that found in *R. Acetosa*. The nitrates are found chiefly in the stalks whilst the oxalates are most abundant in the leaves and flowers. As inflorescence progresses (July 26th), the amount of oxalic acid increases in proportion to the growth of the plant but remains almost entirely in the insoluble form. When inflorescence was fully developed (September 17th), the total weight of the plant had increased six-fold, whilst the amount of oxalic acid remained the same, still in the insoluble form and existing

in greatest abundance in the leaves. It would seem therefore that the formation of oxalic acid takes place principally during the earlier stages of the plant's growth, and ceases during the period of inflorescence.

Chenopodium Quinoa yields a neutral juice which is almost free from nitrates, but contains a relatively large proportion of soluble oxalates. In the early stage of growth (May 18th), the percentage of oxalic acid was 3·9, and the bases in the ash (25·6 per cent.) were far more than sufficient to neutralize the whole of the acid. When the plant was in full vegetation but had not begun to flower (June 12th), the oxalic acid had increased in proportion to the growth of the plant, but was very unequally distributed, about one half being in the soluble form. The absolute amount was greatest in the leaves, next in the stalk, and somewhat less in the roots and flowers, but the relative proportions do not differ much in different parts of the plant. When the plant was in flower (July 17th), there was a considerable absolute, and a considerable though smaller proportional, increase in the amount of oxalic acid, which was still at a maximum in the leaves, and was also abundant in the flowers. The proportion of soluble oxalates becomes greater and greater in passing from the stalks to the leaves, and from the leaves to the flowers. All the parts contain no deficiency of calcium, but the insoluble oxalates predominate in the stalks. At an advanced stage of fructification (September 14th), both the absolute and relative quantities of oxalic acid had diminished, the absolute quantity being greatest in the flowers, whereas the relative proportion was greatest in the leaves. The relative proportion of insoluble oxalates had generally increased, but in the roots the proportion of soluble oxalates had become somewhat high, a fact which indicates that towards the end of vegetation the root absorbs little or nothing from the soil.

Mesembrianthemum crystallinum.—The seed does not contain oxalic acid. In the early stage of growth (June 9th), a considerable quantity of oxalic acid is formed, a part being in the soluble form. Alkaline salts are abundant and the juice is neutral. As growth proceeds (July 8th), the juice becomes acid and the soluble oxalates predominate, the greatest proportion being found in the leaves. At a later stage, when flowers begin to open (September 25th), the juice is neutral in the root, but is acid in the stalks and especially in the leaves.—*Jour. Chem. Soc.*, 1886, p. 734; *Compt. rend.*, cii.

AMERICAN PHARMACEUTICAL ASSOCIATION.

This Association not having met in the New England States since 1875, it was to be expected that the thirty-fourth annual meeting which convened in Providence, R. I., on the afternoon of September 7th, should be attended by a large number of members residing in that section of the country. This expectation was verified; and since Providence is very accessible, and is located in close proximity to numerous places of resort on the seashore, on islands and among the mountains, an opportunity for a few days rest and recuperation was afforded to, and enjoyed by, many after the sessions had finally closed. The weather had become unexpectedly warm; but during the night was moderated by refreshing breezes from the beautiful Narragansett Bay. Though the location of Blackstone Hall, where the sessions were held, was not near as quiet and free from noise as had been supposed, and within the hall the sultriness of the atmosphere was but little mitigated, the attendance at the sessions and the interest manifested in the proceedings were quite satisfactory. The number of members and delegates registered was 175; but considering those who had omitted to place their names on the register, the attendance was, probably, fully 200.

The sessions were opened on Tuesday afternoon with the reading of the annual address by President Roberts. After a few introductory remarks the speaker referred to the present unremunerative condition of pharmacy as a business, and to one of the most prominent causes, namely, to the large and increasing demand for proprietary medicines which filches from the pharmacist so large a portion of his legitimate profits. The so-called "elegant" pharmaceuticals are included under the same head, but the president very properly regards these latter as having attained such importance that they must not be ignored. As a remedy the amplification of a resolution passed by the Maryland State Pharmaceutical Association in 1885 was recommended, urging its members "to use their best efforts to induce physicians, when prescribing, to give preference to officinal remedies."

By way of a retrospect we may be permitted to refer to the action of the American Pharmaceutical Association at the close of the first year of its existence (1853), when the elixir-nuisance and the semi-proprietary pharmaceuticals of the present day were unknown. This action was in opposition to the increasing nostrums; and without quoting the whole, it will be sufficient to state that it was declared to be "the duty as well as interest of the apothecaries and druggists to advocate the use of the officinal medicines in lieu of the quackery of the day; that this can only be done by a united and sustained action on the part of the pharmacists and druggists of the Union, and that this course should receive the sanction of the physicians as the only one likely to remedy the evil aimed at."

It will be seen that these expressions, made one-third of a century apart, are alike in spirit; but President Roberts proposed also the practical action to communicate officially with the various medical associations on this subject.

In next speaking of the diminished numerical growth of the Associa-

tion within the past few years, the business depression was not directly alluded to as one of the causes; but the preponderance given to what is termed scientific pharmacy was prominently put forth, and it was suggested, that the material and scientific interests should both receive due attention, and that the social features should not be permitted to interfere with business. The question of a reserve fund was fully discussed in the light of the report of the Committee on Finance printed in the last Proceedings, Mr. Roberts placing himself in opposition to the accumulation of such a fund, and recommending the abolition of the admission fee, and the discontinuance of an entertainment committee by the Association.

In the multiplication of State and local pharmaceutical associations President Roberts sees a new and important factor of progressive pharmacy, and suggested as one of the methods for cultivating intimate relations and cordial feelings, that suitable questions bearing on the practice of pharmacy, be referred to the State Associations for consideration and report to the National Association, and that the State Associations be invited to communicate freely with this Association upon all questions of pharmaceutical interest that may be deemed of national importance.

Mr. Roberts further advised that every facility be accorded to all pharmaceutical journals for making a full and accurate report of all transactions; that a standing committee on revision of the pharmacopœia be created; that a committee on materia medica or pharmacognosy be appointed as had previously been proposed by Mr. Ebert; and that members of Council should not be eligible for re-election within one year of the expiration of their terms of office. The concluding remarks of the presidential address were devoted to the necessity of exacting greater proficiency from the students proportionate to increased opportunities for acquiring knowledge; and words of caution were offered against an indiscriminate multiplication of colleges of pharmacy without actual need.

The address was attentively listened to and was referred to a committee for consideration and report.

The list of delegates showed that delegations had been appointed from 12 colleges of pharmacy, from 25 State Pharmaceutical Associations, from 7 local societies, and from 7 Alumni Associations. The National Wholesale Druggists' Association was likewise represented by a delegation. A telegram was received from ex-President G. J. Luhn, of Charleston, S. C., regretting his forced absence on account of the destruction of property by the recent earthquake.

The nominating committee was appointed, consisting of one delegate from each college of pharmacy and State Association, and of the following non-delegates: Prof. Remington, E. Bocking, R. H. Vansant, H. S. Wellcome and L. Eliel.

The various committee reports were read by title, and afterward that on membership in full. During the year the number of members decreased from 1359 to 1294, the deaths reported being 20.

The Minutes of Council during the past year were read and approved, and 19 applications for membership were reported.

Notice was given of an amendment to the By-Laws favoring the abolishment of the Committee on Drug Market; but no action was taken on this proposition during the meeting.

An invitation was extended to the physicians and druggists present in the city to attend the sessions and participate in the discussions. The first session closed with the reading of the treasurer's report in which that officer declined a re-election as treasurer.

Second Session.—On Wednesday morning after reading the minutes of the first session and of the Council, the report of the nominating committee was received and adopted by the election of the nominees. The officers for the ensuing year are:

President—Charles A. Tufts, Dover, N. H.
Vice Presidents—Henry J. Menninger, Brooklyn, N. Y.; M. W. Alexander, St. Louis, Mo.; N. A. Kuhn, Omaha, Neb.
Treasurer—S. A. D. Sheppard, Boston, Mass.
Secretary—John M. Maisch, Pennsylvania.
Reporter on Progress of Pharmacy—C. Lewis Diehl, Louisville, Ky.
Members of Council—George W. Kennedy, Pottsville, Pa.; A. H. Hollister, Madison, Wis.; William H. Rogers, Middletown, N. Y.; P. C. Candidus, Mobile, Ala.

The chairmen of the standing committees were as follows: Drug market, G. J. Seabury, New York; papers and queries, Virgil Coblentz, Springfield, O.; prize essays, C. L. Diehl, Louisville; legislation, T. L. A. Grieve. At a later period Mr. Seabury declined serving on the committee on the drug market, and Mr. A. H. Mason, Montreal, was elected in his place. Mr. Grieve resigned from the committee on Legislation, stating that Mr. Chas. W. Day, Springfield, Ill., had really received the nomination, and the name of this member was accordingly ordered to be put in the place of Mr. Grieve's.

A telegram from San Francisco, inviting the Association to meet in that city, was read and referred to the committee on the time and place of the next annual meeting, consisting of Messrs. J. D. Wells, Emlen Painter and P. W. Bedford.

Mr. Sheppard proposed an amendment to the by-laws, reducing the treasurer's salary from $750 to $600, which was adopted at the fourth session.

Three candidates were proposed for membership, after which the reports of the committees were read. The first one read was on *Legislation*, reporting new pharmacy laws having been passed during the year in the State of Virginia and the territory of Wyoming, and amended laws for Kings county and Erie county, N. Y., and for the States of Iowa and New Jersey; also laws requiring the use of red labels for morphine in the States of Florida, Georgia, Kentucky, New York, Ohio and Virginia, and amendments to the adulteration of food and drug law of the State of New York. The report also presented the following preamble and resolution with the view of communicating to the proper authorities the action of the Association in regard to legislation on proprietary medicines:

Whereas, All medicines concern the health of those who use them; and

Whereas, The purchaser of a medicine selected by himself, has the right to receive information of its constituents and their qualities; and

Whereas, The report and the draft of a law regulating the sale of proprietary medicines, which were accepted by the American Pharmaceutical Association at its meeting held in September, 1885, embrace a method whereby the above mentioned objects may be secured; therefore, be it

Resolved, That the President and other officers of the Association be authorized and instructed to present printed copies of the reports and of the action had in this Association upon said reports, to the Governors, to the Speakers of the Senates and Houses of Representatives, and to the State Boards of Health of the different States of the United States; also to offer any services wherein these authorities may consider the co-operation of this Association desirable or useful.

A motion by Mr. Macmahan to strike out the resolution was defeated by a vote 20 ayes and 47 nays; and after a motion by Mr. E. A. Sayre, to lay it on the table was lost, the resolution was adopted.

A report by Mr. Sloan, on the best time for holding the annual meeting was presented. Of a total of 781 members, 345 had designated the month of September, 145 August, and 118 October, as the most suitable month, the other 173 votes being divided among the remaining nine months. The correspondence had also elicited the information that many pharmacists could not afford the expense of time and money necessary in attending, and that a number of valued members were not in sympathy with the entertainment methods; it was therefore suggested to drop entirely the subject of entertainments.

Mr. Kline read the report on the drug market, prepared by him, in place of the chairman who had been prevented. The report gives the average prices of the more important drugs, and discusses the causes that lead to an increase or decline.

Mr. Lemberger read the report of the committee that had attended the meeting of the National Wholesale Druggists' Association; the committee from the latter was formally received, and another committee was appointed to attend the next meeting in St. Paul.

Further reports were read on publication, on prize essays, and on the national unofficinal formulary; the latter report made a number of suggestions, having in view the publication of a preliminary draft of such a formulary, and its perfection before final adoption.

The report of the Committee on the president's address was ordered to be printed and made the special order for 10 o'clock on Thursday morning; and the Committee on the next annual meeting was requested to report immediately afterward.

The third and subsequently also the fifth session were set apart exclusively for the reading of papers.

Fourth Session.—A motion was made by Mr. Redsecker, that in addition to the five members who constituted the Committee on unofficinal formulas during the past year, there shall also be appointed one member of each State Association, all of whom to constitute the Committee for the present year, and that five members shall constitute a quorum for the transaction of business. This was adopted.

The report on the President's address having been printed and distributed among the members, the resolutions appended thereto—except the last one —were adopted as follows:

Resolved, That this Association solicit the aid and co-operation of the American Medical Association, in promoting the describing by physicians of officinal medicines only, or such preparations as have published formulas, in preference to others; and that the several State Pharmaceutical Associations make similar requests of their respective State Associations.

Resolved, That a committee of five be appointed whose duty it shall be to inquire if there be a better plan for the management of this Association than the existing one; said committee to be appointed by the chair, and to represent the various sections of the country.

Resolved, That the committee on publication are hereby instructed to have the annual proceedings published and ready for delivery on or before January 1st; and they are also instructed to omit from said publication any papers that may not be in their possession in proper time for the execution of this resolution.

Resolved, That the multiplication of colleges of pharmacy should be discouraged except where the need of them is undoubted.

A standing committee on the Revision of the U. S. Pharmacopœia, consisting of five members, was created but not elected.

The last resolution contemplating the discontinuance of the admission fee excited considerable discussion, and an amendment offered by Mr. Ebert to reduce it to $2 was finally carried by a vote of 61 ayes to 39 nayes; and chapter viii., art. iii. of the by-laws was then altered, 94 voting in favor and 6 in opposition.

The Committee on the next annual meeting presented a majority report in favor of Cincinnati, and a minority report in favor of San Francisco. The adoption of the minority report was lost by a vote of 26 ayes to 59 nayes; and amendments to the majority report to meet in Put-in-Bay and in Detroit being likewise negatived, the report was then adopted, and on motion of Mr. Macmahan, the time was fixed for the first Monday of September, at 2 o'clock p. m. Messrs. Remington, Thompson, Alexander, Macmahan and Sheppard, were appointed the committee on the order of business.

Sixth Session.—In order to finish the business, each speaker was limited to three minutes.

Mr. G. W. Voss of Cincinnati, was elected local secretary and chairman of arrangement committee.

The Committee on the order of business reported progress and were granted time until next year to bring a full report.

A committee appointed for the purpose reported a resolution of sympathy with the Charleston sufferers, which was adopted and ordered to be communicated to ex-President Luhn.

The amendment to the by-laws offered by Mr. Day, to abolish the admission fee was, on motion of Mr. Macmahan, laid upon the table, and the amendment proposed by Mr. Colcord to reduce the dues to $3.00 was not concurred in.

On motion of Prof. Markoe, the arrangement committee was specially requested to secure for the next meeting a hall in a quiet locality. After

passing votes of thanks and other routine business the Association then adjourned.

As stated before, the third and fifth sesions had been set apart exclusively for the reading of papers. In another place we print the following papers in full: Analysis of Phlox carolina, by Prof. Trimble; Assay of Guarana, by H. W. Snow, and Determination of Melting Points, by H. C. C. Maisch.

The remaining papers presented were as follows:

A Study of Peptonization, by R. G. Eccles, M. D.—This is a lengthy inquiry into the nature of peptones, and the conditions of digestion in the presence of various acids and other compounds, and at different temperatures. While many salts throw down a portion of the peptones, the best precipitants are the sodio-hydric and disodic molybdates, causing white precipitates which are partly soluble in ammonia with a light blue color; but in the presence of potassium citrate or acetate, which salts throw down a portion of the peptone, the molybdate fails to produce a precipitate. Many samples of pepsin yield similar precipitates with the molybdate, but it has not yet been ascertained whether pure pepsin is thus affected. True peptone is the product of true digestion, and is soluble in alkaline, acid and neutral liquids, while parapeptone, an injurious product of semi-digestion, is precipitated by salts in neutral solutions, and in some cases also from acid liquids. The best results for the peptonization of ground albumen at a temperature of 38°–40° C., were obtained with ·3 and ·2 per cent. of HCl in 90 minutes, and with ·2 per cent. in 30 minutes, while the peptonizing power decreased if less than 1 per cent. of phosphoric, citric or tartaric acid was used. The effects of other acids differed from these. For the purpose of testing the peptonizing power, the temperature of 55° C. (130° F.), applied for 30 minutes, was found to be the best. Pills containing pepsin and reduced iron, had been found to have no digestive power, and it was ascertained to be due to the disappearance of the free acid. Alcohol scarcely interferes with artificial digestion until the strength of the mixture exceeds 8 or 10 per cent. The cinchona alkaloïds have a retarding effect, but less in the presence of excess of acid. Marked retarding effects were also observed with all salicylates, bismuth citrate, alkalies, alkaline salts, oils of cinnamon and cloves, excess of glycerin, etc.

A Study of Pepsin, by R. G. Eccles, M. D.—In the light of the foregoing results, 22 commercial samples of American and European origin were subjected to a comparative examination, and it was found that the prices charged for the different brands were no indication of the digestive power. Selecting as the standard, a scaled pepsin, the market price of many brands were found to be of much less value than the price paid for them, while others, apparently such which are made in response to the requirements of the Pharmacopœia, were found to be worth more than they cost, the price per ounce being about 35 cents, and the value according to the standard adopted about 50 cents. However, some of the articles contain also other ferments, which may very materially raise their true value. Pepsin which becomes sticky seems to decrease in value, while dry and saccharated pepsins retain their digestive power, for several years at least.

Since there are different modifications of pepsin, some of which—*isopepsin*—produce parapeptone instead of peptone, it is important to know that the presence of a small quantity of table salt checks this production quite effectually, and interferes also to some extent with the production of true peptone.

Paste for labeling, by L. Eliel.—1. Tragacanth, 1 oz., gum arabic, 4 oz., water, 1 pint; dissolve, strain and add thymol, 14 grains, glycerin, 4 oz., and water to make 2 pints. Shake or stir before using it.

2. Rye flour, 4 oz., alum, ½ oz., water, 8 oz.; rub to a smooth paste, pour into a pint of boiling water, heat until thick, and finally add glycerin 1 oz., and oil of cloves, 30 drops.

3. Rye flour, 4 oz., water, 1 pint; mix, strain, add nitric acid, 1 drachm, heat until thickened, and finally add carbolic acid, 10 minims, oil of cloves, 10 minims, and glycerin, 1 oz.

4. Dextrin, 8 parts, water, 10 parts, acetic acid, 2 parts; mix to a smooth paste and add alcohol, 2 parts. This is suitable for bottles or wood, but not for tin, for which the first three are likewise adapted.

A paste very similar to 3, but omitting nitric acid and glycerin, is also recommended by Dr. H. T. Cummings.

Notes to a few of the queries, by Dr. H. T. Cummings.—The notes are on concentrated nitrous ether, ethereal oil, and oil of cajeput, with quotations from Gmelin's chemistry and other sources, and with suggestions deduced from these observations.

Spirit of nitrous ether, by Prof. Emlen Painter.—This is recommended to be made from pure nitrous ether, and this to be prepared by the action of nitrous acid gas upon alcohol. The gas is generated from a mixture of sulphuric acid, 2 lbs., arsenious acid, in lumps, 2¼ lbs., and nitric acid, 2½ lbs., and is conducted through an empty bottle, successively through two bottles containing alcohol, and a third bottle containing water and sodium bicarbonate for the retention of any free acid, into the condensing vessel surrounded by ice where pure nitrous ether is obtained. This should then be mixed with three times its weight of alcohol, in which condition it may be preserved. One part of this mixture, with four parts of alcohol, makes spirit of nitrous ether of the pharmacopœial strength.

Loss of alcohol in making tinctures and fluid extracts, by J. G. Feil.—Working with from 5 to 50 pounds of drugs, the loss of alcohol averaged 9·8 per cent.; working with smaller quantities, it is estimated to exceed 25 per cent. in some cases.

Concentrated liquid preparations for dilution, by J. L. Lemberger.—The author considers it quite feasible to prepare concentrated liquid preparations of some drugs which may be diluted so as to bring to the pharmacopœial strength. The concentrated liquor of gentian for preparing the compound infusion of gentian is cited as an example, and from honestly prepared fluid extracts of ergot, aconite root, or nux vomica, a wine or tincture can be prepared, filling all the requirements of the corresponding pharmacopœial preparations.

Soluble Essence of Ginger, by Luther F. Stevens.—After a critical review of

the various methods which have been recommended, the author finds the following process yielding a liquid containing everything desired without having the flavor and aroma impaired, as is the case with the employment of heat, alkalies or carbonates: Shake 1 pint of fluid extract of Jamaica ginger with 4 ounces of powdered pumice stone, and shake with 3 pints of water, adding it slowly and allowing intervals for rest and subsidence. The water precipitates the hot resin and some coloring matter, the formation of clots being prevented by the pumice stone. The filtered product is of a light straw or amber color, of an agreeable odor and flavor and therapeutically is a prompt diffusible stimulant without irritating properties. The hot resin may be obtained from the filter by drying and washing with alcohol.

Glyconin and its Uses, by Geo. C. Close.—The author calls attention to this compound which was first recommended for external use by Edmond Sichel (see AMER. JOUR. PHAR., 1867, p. 181; also Proc. Am. Phar. A., 1869, p. 386), and which Mr. Close has used for emulsionizing oils since 1873. The Pharmacopœia has admitted it under the title of *glyceritum vitelli.*

Pill excipient, by G. W. Sloan.—Simple cerate is recommended as being well adapted for readily decomposable or deliquescent substances, such as silver nitrate, silver oxide, gold chloride, potassium permanganate, ammonium chloride, zinc bromide and many others. The quantity required is small, and the mass produced is smooth, plastic, firm and readily soluble in the stomach. Powdered talc is used as a diluent if necessary, and as the powder for the pill machine.

Abstracts, by Virgil Coblentz.—This paper is a continuation of previous researches (see AM. JOUR. PHAR., 1885, p. 513). For assaying *abstractum ignatiæ* the alkaloids were isolated by the method of Dunstan and Short, but it was found necessary to agitate the acid solution repeatedly with ether and chloroform in order to remove all coloring matter and extractive; agitation with ammonia and absolute ether containing chloroform then yielded the alkaloids white. For the estimation of the alkaloids, strychnine and brucine, Mayer's solution gives variable results, as has been shown also by Dr. A. B. Lyons (Drug. Circ., June, 1886). Dunstan and Short's method with potassium ferrocyanide gives correct results, but requires close attention and does not permit of rapid work. Dr. Schweissinger's alkalimetric method is rapidly executed and exact. 1 cc. $\frac{1}{10}$nHCl neutralizes 0.00394 gm. brucine and 0.0034 gm. strychnine. The weighed mixed alkaloids are dissolved in a slight excess of measured $\frac{1}{10}$ nHCl; the excess of acid, determined by $\frac{1}{10}$n alkali, is deducted; the total weight of alkaloid is divided by the number of cc. required for neutralizing it; the quotient is substracted from 3.94; the remainder is divided by 6, when the quotient, after removing the decimal point three places to the right, indicates the weight of strychnine, that of brucine being found by difference. When the amount of alkaloid is small, weighing of the solutions gives the most accurate results; with more than 0.1 gm. measuring is practically accurate. The total alkaloids from 5 gm. of the abstract varied in five samples between .194 and .237 gm.; the strychnine between ·1068 and ·1813 gm.

Abstractum Podophylli.—Five samples were examined by treating with alcohol, concentrating and precipitating with acidulated water; the amount of resin thus obtained varied between 6·5 and 11·5 per cent., equivalent to from 3·2 to 5·9 per cent. of the drug.

Abstractum Valerianæ.—The amount soluble in strong alcohol from 5 gm. of five samples varied between 0·93 and 1·17 gm.

Abstractum Senegæ.—The abstract was exhausted with a mixture of 2 alcohol and 1 water, the liquid concentrated, freed from coloring matter by ether and precipitated by alcohol and ether. The yield of 5 gm. from six samples varied between ·340 and ·503 gm. Procter obtained 5½ per cent. of polygalic acid from senega root.

Abstractum Belladonnæ.—The alkaloid was estimated by the method of Dunstan and Ransom (Am. Jour. Phar., 1885, p. 582), and in five samples corresponded to from ·41 and ·68 per cent. of belladonna root.

Evaporation of Percolates, by J. U. Lloyd.—Attention is called to the results of evaporating different quantities of identical percolates under otherwise similar conditions. Small quantities of vinegar of squill, after concentration, gave a light amber-colored liquid; but on concentrating larger batches the color is finally deeper until a dark-brown red is produced. The temperature used in the experiments was between 175° and 180° F. Working in the pharmacopœial quantities yields the less altered product.

The maintenance of standards of purity was discussed in a paper by Prof. J. M. Good, and the relation in this respect existing between the wholesale druggist, the manufacturer and the dispenser.

Quality of Belladonna leaves, by Dr. A. B. Lyons.—In a large number of assays of the leaves, the author obtained once as high as 0·87 per cent. of alkaloid, and as low as 0·23 per cent.; the average was about 0·44. Twelve assays of *belladonna root* yielded between 0·42 and 0·86 alkaloid; average, 0·618 per cent. The average yield of extract with 66 per cent. alcohol was for the *root* 26·27, and for the leaves 22·5 per cent. The amount of alkaloid does not appear to decrease in pressed leaves kept for several years.

Oleum menthæ piperitæ, by A. M. Todd.—The paper gives a brief history of the cultivation of peppermint in England and in the United States for the production of the volatile oil, the distillation of the latter, the characters of purity and tests for the detection of some adulterations. The more important points which have not been previously noticed in this journal will be referred to in another place.

Cannabis indica was again examined by G. W. Kennedy for the presence of nicotine, which Preobraschensky claimed to have found in 1876. M. Kennedy demonstrated its absence in the commercial drug.

American carbolic acid, by Edgar M. Hatton.—The author arrives at the conclusion that carbolic acid is made in America which can well be depended on as a medicinal agent and may be used in dispensing. Low grade acids are strictly American products; and it is suggested that the sale of the true acid be encouraged.

Hydronaphthol, by Thos. W. McElhenie.—This substance has been noticed in this volume, pp. 93 and 158. It is recommended by the author for the

preservation of solutions for hypodermic injections, using from 5 to 7 grains to a pint of distilled water; also, for the preservation of beef juice, by sprinkling on a pound of finely chopped beef about 10 grains of the chemical, warming to 130° F. and expressing quickly. Most of the chemicals tried produce no change with the compound; nitric acid causes an orange-yellow color changing to a turbid olive-green, which, in reflected light, appears dull purple. Ammonia produces a purplish tinge, becoming straw-colored.

Butter and its substitutes, by Prof. E. Scheffer. The author recommends as a suitable solvent for detecting adulterations or substitutions of butter, a mixture of 40 volumes of rectified amylic alcohol and 60 volumes of ether. In applying the test, the substance and solvent are placed together in a corked test-tube at about 65° F., and slowly warmed until the temperature reaches 82° F. It was found that 1 gm. of the following fats and mixtures of fats require for solution the annexed amounts of solvent:

Butter,	3	cc.	Lard 5, butter 95			parts,	3·5	cc.
Beef suet,	50	"	"	1,	"	9 "	3·9	"
Leaf-lard,	16·4	"	"	2,	"	8 "	4·8	"
Neutral lard,	13·5	"						
Cottonseed oil,	1.75	"	"	3,	"	7 "	5·7	"
Stearin,	550	"	"	4,	"	6 "	6·5	"
Oleomargarin,	11·2	"	"	5,	"	5 "	7·8	"
"	8·6	"	"	6,	"	4 "	9·6	"
Oleo oil,	2·3	"	"	7,	"	3 "	11·4	"
Butterin, I.,	11	"	"	8,	"	2 "	13	"
" II.,	8	"	"	9,	"	1 "	14·4	"

The simplicity of the manipulation, and the characteristic differences in the behavior of fats to the solvent make this well adapted not only for the determination of adulterations, but also for the approximate quantitative estimation of the adulterant. The butyric ether test will readily distinguish butterin from oleomargarin.

Dioscorea bulbifera, by J. U. Lloyd. A specimen of the plant with its axillary tubers was shown; it had been cultivated in Louisiana.

Poisoning by Vaseline.—The reports of positive injury having been worked by the use of ointments, with vaseline as a base, upon the eye and upon the integument are not single and far between, the mischief being generally attributed to impurities of the preparation. In the *British Medical Journal,* Feb. 13, the poisoning of three children, aged from 8 to 14 years, is reported as a consequence of the internal administration of about half a teaspoonful of vaseline for sore throat. Pain and cramps in the extremities and severe vomiting ensued. No other cause than the taking of the vaseline was apparent.—*Weekly Med. Review,* May 8, 1886.

BRITISH PHARMACEUTICAL CONFERENCE.

The 23d annual meeting was inaugurated on Monday evening, August 30th by a reception held in the Grand Hotel, Colmore Row, Birmingham, which proved to be a very pleasant and useful innovation, as it furnished an opportunity for many introductions and renewals of acquaintance at the earliest stage of the meeting. The sittings were held in the handsome Chemical Lecture Theatre of the Mason Science College, and the proceedings commenced at ten o'clock on Tuesday morning, August 31st, with a hearty greeting from Mr. Thomas Barclay, as the chairman of the local committee, which was supplemented by a graceful welcome from Professor Tilden, who expressed the pleasure with which he met so many of his old pharmaceutical friends in that theatre. The list of delegates, which was a fairly long one, having been read, Dr. Thresh, one of the honorary secretaries, read the annual report. This document commenced by referring to the steps that had been taken to carry out the announcement made at Aberdeen as to the compilation of a general index. The members were reminded that the index had been compiled and published and it was stated that the nominal price at which it has been issued will result in an encroachment on the cash balance. It next mentioned the satisfactory increase in the number of members in India and the colonies, which was attributed to the efforts of the various secretaries. The report alluded to the death since the last meeting of Mr. William Southall, who filled the office of President of the Conference in 1880. Finally, it was mentioned with regret that Mr. Sidney Plowman, who for five years has so energetically served the Conference as one of its honorary secretaries, had expressed his wish to retire from office after the present meeting. The address of the President, the delivery of which followed the adoption of the report, was somewhat ambitious in its tone, but for this it had the justification that two at least of the topics discussed are of vital interest to the future of pharmacy in Great Britain. In fact, in his choice of subjects the President seems to have been influenced by a profound dissatisfaction concerning the present condition of pharmacists in this island as well as—tell it not in Gath—considerable doubt as to whether the Conference has done, and is doing, all of which it is capable to ameliorate this condition. Only a few brief references were made to the past, avowedly on the ground that it presented so little that was cheering and so much that was discouraging. These references, however, included an expression of opinion that experience with the new Pharmacopœia during the last twelve months has shown that it does not represent the advance made by pharmacy since the issue of the previous edition; a suggestion that pharmacists do not as a body do all that might be done towards improving pharmacopœial processes, or working out the history of little-known drugs before they get into the hands of the "mystery mongers," followed by a hope that the projected research laboratory may remove that reproach; and an allusion to the benefits resulting from international gatherings, *à propos* of the International Pharmaceutical Congress in Brussels last autumn. The President then proceeded to develop the main theme of his address, pausing by the way to utter, a little cynically, his reluctance to "throw a stone into so placid a pool of self-esteem," the subject being the necessity that the Conference should, if it desires to maintain its *raison d'être*, assume more active duties than it has hitherto done. Calling in

the fixity of physiognomy at recent meetings, and the increase in the number of papers read in the absence of authors and not followed by discussion, as evidence that the Conference is getting into a rut, the possibility of this being due to the absence of non-technical subjects from the discussions was suggested. Reference was then made to the fact that the address of the President of the American Pharmaceutical Association, which usually deals with more general topics, is handed over to a committee to consider such suggestions as it may contain and formulate any recommendations respecting them that may be desirable for report at a subsequent sitting of the same meeting of the Association. It was thus evidently implied that a similar course might be followed with advantage by the British Conference, and the hint, as will be seen, was taken in respect to one subject. The President then introduced his first course of "food for active thought."

The non-existence of pharmacy for pharmacists in provincial towns; the rare glimpses many apprentices get at a prescription; the slight distinction to be observed in many cases between the business available to a qualified chemist and druggist and that of a drysalter: these evidently played the part of condiments, but were not intended as the dish itself. The evils exist, and their pungency is only too evident; but the remedies for the irritation caused by them is not so obvious. Of course, the more complete separation of medicine from pharmacy suggests itself; but the time for this seems yet far off. In the President's opinion, legislation in this direction must not be expected, and he has more hope in the skill of the pharmacist intensifying the distinction between dispensing in a pharmacy and dispensing in a surgery, and in the improved education of the medical practitioner. But one evil with which the President of the British Pharmaceutical Conference thinks that body might grapple is what he defines as "wholesale prescribing for the medical profession." The "factory made" proprietary preparations which are perseveringly forced on the attention of the medical profession he looks upon as sapping the foundation of true pharmacy, and depriving the pharmacist of the legitimate practice of his calling. Without, therefore, discussing the therapeutic value of such preparations, he recognizes the continual prescribing of them by medical practitioners as indicating a want that pharmacists should lay themselves out to supply. He would therefore make it the business of the Conference, as soon as unofficial preparations of a certain type attain favor with the profession, to construct formulæ fairly representing them, and issue them as unofficial formulæ, which might be prescribed by medical men, with the addition of the letters "B.P.C." He believes that medical men would be willing, as it would be to their own interest, to prescribe preparations of a known composition rather than "nostrums" of which they know little or nothing, whilst it would then be within the power of every pharmacist to prepare such preparations within his own pharmacy.

Another dish of "food for active thought" provided by the President had reference to the still unsatisfactory and inadequate provision for pharmaceutical education in the provinces. It was pointed out that, notwithstanding all the labors of the past, pharmacists are still only very incompletely organized, and an opinion was expressed that the non-existence of suitable provisions for supplying the wants of pharmaceutical students was not so much due to the

insufficiency of the demand for sound education in pharmacy and the science-allied to it as to the absence of adequate provisions for focussing the demand in such quantities as to ensure its supply. For the organization of such demand and supply it was proposed that Great Britain should be divided into about fifteen districts, each of which should be under the supervision of a representative local committee, having for its business, among other things, the establishment of one or more educational centres in the district, care being taken to utilize, so far as possible, any existing university or college teaching. Statistics were quoted to the effect that eight hundred candidates present themselves annually for the pharmaceutical examinations, of whom nearly four hundred pass, as evidence that there should be ample material for so limited a number of educational centres to draw upon to make most of them self-supporting. But supposing there were centres for which assistance could be legitimately expected, it was pointed out that the Council of the Pharmaceutical Society might well be called upon to fulfil the promises that it has made under successive presidents, to render assistance when there is satisfactory organization. Looking about for suitable constituents for such committees, Mr. Greenish thinks these might be found in the local secretaries to the Pharmaceutical Society in each district, who would not only form strictly local and representative committees, but would just give that contact with that Society which in view of a probable demand for pecuniary assistance the Council might fairly require. Moreover, it was pointed out that such organizations would be extremely valuable for other purposes, and it was significantly added that probably the next political struggle in which pharmacists would find themselves as a body engaged would be for the existence of present rights rather than the extension of present privileges. Recognizing the necessity for something more than empty declamation as to wants, Mr. Greenish then proceeded, with the aid of maps, to a description of the proposed divisions. From this it appeared that in England and Wales he suggests there should be twelve districts, and in Scotland three; the committees then, supposing that they included all the local secretaries in the respective districts, would in England and Wales, as a rule, number from twenty to thirty members, whilst in Scotland they would number about ten. Any approximate estimate as to the cost of carrying out such a scheme is of course out of the question without further inquiry; the figures quoted rather took the form of the outside possible cost to the Pharmaceutical Society, supposing it undertook the responsibility. Taking three hundred and fifty as the outside total under present arrangements, of the possible members of the committee, it was suggested that each committee might be limited in its expenditure for travelling, etc., to twenty shillings per head per annum, which would be covered by a sum of £350. Another estimate of £300 was arrived at by supposing that direct subsidies in aid of the classes might be required to the extent of an average of £20 for each district. The two sums would form a total of £650, which Mr. Greenish speculates might be somewhat reduced by local subscriptions to ensure interested supervision, and he suggests that the balance, possibly £500 a year, might be found by the Pharmaceutical Society. A sympathetic allusion to the late Mr. William Southall, then brought the address to a close.

It will be seen from the foregoing sketch that the Presidential address to the

British Pharmaceutical Conference this year offers ample material for discussion; but whether this will be taken advantage of it would be unsafe in the light of past experience to predict. On our part we express the hope that at least the recognized leaders in pharmacy, and especially those whose names have been associated in the past with the subject of provincial pharmaceutical education, will, as soon as may be practicable, express their opinions upon Mr. Greenish's propositions. In doing so it would be well to remember that, in respect to points of detail, these propositions are to be considered open to modification; so far as we understand Mr. Greenish's intention they are simply intended to form a nucleus for criticism. Whether there shall be fifteen or thirty divisions; whether the boundaries shall follow county or other recognized lines, or remain arbitrary as in Mr. Greenish's map; the persons who shall constitute the committees, and how much they are to be allowed to spend, are insignificant questions compared with the one, whether committees for organizing centres of education for definite districts shall be appointed at all. The advantage of the present position is that an idea that has been floating in many minds more or less definitely, and which has been more than once hinted at, has now been put into a concrete form that will allow of its proper discussion with a view to its adoption or final rejection. These remarks will apply with equal force to the question as to special preparations. The first thing to be determined is whether these subjects are to be dealt with at all on the broad lines indicated in the presidential address, and if this be answered in the affirmative the elaboration of the details would follow as a matter of course.

The novelty of the position, perhaps, may account for the address not having been dealt with at once exactly on the lines suggested; but immediately after a vote of thanks had been accorded to the President by acclamation, on the motion of Mr. Thompson, seconded by Mr. Arblaster, notice was given by Mr. Reynolds that he would bring forward a practical motion in respect to the special preparation question on Wednesday morning.

Aconitine.—The reading of papers was then proceeded with and notwithstanding so much had been written about aconitine, an interesting communication from Mr. Williams showed that the last word has not yet been said on the subject. In the first portion of the paper Mr. Williams described the process adopted by him in producing crystallized aconitine to meet the growing demand for it. The material used, he considers, should be derived from *Aconitum Napellus* only, care being taken to exclude the tubers from other species. The roots are not dried at a temperature sufficiently high to allow of being finely powdered, but a coarse powder is exhausted with 62° to 64° alcohol containing tartaric acid by a process of maceration and percolation. From the strong tincture the spirit is distilled off at the lowest possible temperature, and the residual thin aqueous extract is filtered through paper, which removes some resinous matter, then shaken up with ether, which removes some oily matter, and next treated with sodium carbonate, which precipitates the crude alkaloid. This is washed in moderately hot water, dried in the air, powdered and macerated in pure washed ether, from which it crystallizes on evaporation. It has been recommended by Groves, Wright and Mandelin that the base should be converted into nitrate as a means of purification. But although

admitting the facility which the nitrate presents for obtaining a crystalline product, Mr. Williams evidently doubts whether so delicate an alkaloid can escape alteration in contact with nitric acid, and thinks the probability of a change is indicated by the difference in the form of the crystallization of the base before and after conversion into nitrate and subsequent liberation. This point is at present the subject of physiological experiment. The paper was followed by an interesting discussion, opened by Mr. Groves, who somewhat pooh-poohed the probability of alteration being necessarily consequent upon the conversion of the base into a nitrate if common sense ruled the manipulation. Mr. Groves suggested the cultivation of some true *Aconitum Napellus* plants, with a view to more exact experiment, and the hazy knowledge existing in respect to the particular compound obtained from tubers of different botanical origin was adverted to by several speakers, the fact being emphasized by Mr. Holmes remarking that there are as many as twenty-four varieties of that species.

Hymenodictyonine.—Mr. Naylor then contributed another instalment to the chemical history of the bitter alkaloidal principle isolated by him from the bark of *Hymenodictyon excelsum*, used in India as a tonic. Some of the experiments now recorded consisted in attempts to obtain an iodine derivative of the alkaloid in a crystalline form; these, however, were unsuccessful, though an amorphous body was obtained which gave on analysis 47·52 per cent. of iodine, which corresponds pretty nearly with the formula $(C_{23}H_{40}N_2)_2$-$I_3.2HI$. A similar failure attended attempts to obtain a crystalline bromine derivative. Other experiments had for their object to ascertain the effect of oxidizing agents on hymenodictyonine, the general result being an indication that like other non-oxygenated alkaloids it is constitutionally related to pyridine.

The time had now arrived for adjournment to luncheon, which was provided at the Grand Hotel.

Elaterium.—Upon resuming the first paper read was on the Assay of Elaterium, by Messrs. Jones and Ransom, which was partly devoted to the explanation of the defective nature of the method given in the Pharmacopœia and partly to the description of an improved method by which the determination of elaterin may be more correctly carried out.

Pareira brava.—The next paper, by Mr. William Kirby, had for its subject a false pareira brava from the West Indies. The histological peculiarities of this root as well as the stem were fully described, and will be illustrated when the paper is published. The reading of this paper gave the President an opportunity of reiterating his opinion as to the value of the microscope as a means of detecting intentional sophistication or the accidental substitution of one drug for another.

Ulexine.—The separation of an alkaloid, to which the name "ulexine" was given, from the seeds of the common furze, was announced by Mr. Gerrard a few weeks since (see this number, p. 489) but the method of preparation then described was defective and wasteful. Mr. Gerrard now states that it can be separated more effectively by treating the oily extract removed from the crushed seeds by alcohol with dilute hydrochloric acid, neutralizing the acid liquid with sodium carbonate, and after allowing resin to deposit adding excess of caustic soda,

and shaking the alkaloid out with chloroform; upon treating the chloroformic liquor with dilute hydrochloric acid and evaporating ulexine hydrochlorate is obtained in crystals. The free base is separated in a crystalline form by decomposing the purified hydrochlorate in aqueous solution with soda, shaking it out with chloroform and evaporating. The yield of ulexine from the seeds by this process was only 0·191 per cent,; the alkaloid has also been obtained from the bark and young tops of furze, but in still smaller proportion. Ulexine is described as being soluble in its own weight of water, but quite insoluble in ether. It readily forms crystalline salts, and these, as well as the base, are said to give a characteristic deep red color with ferric chloride. Mr. Gerrard devoted a paragraph to the galenical preparations of furze, but propably this information may, without disadvantage, await the publication of the paper.

False cubebs.—In some notes on the chemical examination of the fruit of *Daphnidium Cubeba*, which were epitomized by Mr. Umney in the absence of the authors, Messrs. Braithwaite and Farr described the results of their experiments with the several extracts obtained by treating the material successively with petroleum spirit, ether, alcohol and water. They succeeded in ascertaining the presence of rather more than one per cent. of a volatile oil, and a considerable amount of fat oil containing oleic, capric and lauric acids, together with resinous substances presenting characters analogous to those of alkaloids and glucosides, but owing to the want of sufficient material these constituents could not be thoroughly studied. A sample of the oil which was shown differed markedly in odor from the oil of genuine cubebs, resembling pretty closely in this respect oil of lemon grass.

Citrate of iron and quinine.—The last communication read on Tuesday consisted of notes on the examination of some trade samples of this compound, by Mr. F. H. Alcock. The samples, six in number, which were described as "typical representatives of B.P. kind," were examined in respect to solubility, amount of ferric oxide, alkaloidal constituent and sulphate present. Only one sample was represented as coming up to the B.P. standard in containing 15 per cent. of alkaloid, and this sample also gave the best result in respect to solubility, but it contained as much as 1·812 per cent. of sulphate. This quantity of sulphate was exceeded in two other specimens, and suggested the possibility that quinine sulphate had been added directly in their preparation. In the discussion which followed this paper, Mr. Umney expressed an opinion, which met with a general affirmatory response, that citrate of iron and quinine which does not answer to the present official requirement in containing 15 per cent. of quinine is improperly made, and is a disgrace to pharmacy.

After this discussion the Conference adjourned until Wednesday morning. A very pleasant sequel to the day's proceedings was arranged by the local committee, which had provided a number of brakes, some of which conveyed a party of members to the Mint, where ample opportunity was given for seeing the process of minting coins of copper, bronze, nickel and brass, from the melting of the alloy to the striking of the coin. Another party meanwhile visited the exhibition, and at 6 o'clock, having rejoined, the whole of the members were taken for a beautiful drive into the southern suburb of Birmingham.

Studies in botany and materia medica.—On Wednesday morning, Professor Hillhouse, of Mason's College, read a paper in which he showed that for the sake of ensuring thoroughness in the study of botany and materia medica these subjects should be taught with a suitable regard for and co-ordination with the study of other branches of science, which, like physics, chemistry and physiology, deal with the same subject matter from different points of view, and also with due regard for the practice of those arts, which, like medicine and pharmacy, require a knowledge of drugs and their composition and effects. He pointed out that the study of botany is with the pharmaceutical student largely a means to an end, namely, the systematic and intelligent study of some portion of the heterogeneous subject known as materia medica, and his object was to suggest how the study of botany might be best directed towards eventually qualifying the student for that work. Under the conjoint system adopted in reference to medical education, Professor Hillhouse considers that this correlation of different branches of science has not been sufficiently regarded, since the teaching of a branch of knowledge which most persons would consider to be dependent on prior chemical and botanical training is to be deprived of its botanical side, while the period assigned for teaching therapeutics is limited to the first year of the student's career. Although pharmaceutical study is still without any definite regulation the considerations treated of by Professor Hillhouse are well worthy the attention of all who hope to see that deficiency removed, and from the rapid progress of science in all directions it becomes especially important from a practical point of view so to adjust the teaching of the different branches that time may be economized, and with regard to the specific object of the course of study the teachers may, to use Professor Hillhouse's words, "play into each other's hands." The first part of the discussion which followed the reading of this paper referred to the subject from a medical point of view, Dr. Trimen, for instance, differing materially from the author and speaking of the absurdity of professing to arrange a complete course of botany that would be suitable to the conditions of the medical student. Mr. Holmes, Mr. Martindale, Mr. J. C. Shenstone and others, however, brought the question back within pharmaceutical range and argued that the teaching of botany to pharmaceutical students should be made more practical than it is at present.

Unofficial formulary.—The next business transacted by the Conference involved an innovation which will probably distinguish this from every other meeting that has preceded it. It will be remembered that in his address the President suggested that the Conference might undertake the task of compiling a non-official formulary. Mr. Reynolds now moved a resolution which practically covered this suggestion, the exact words being, "that in order to secure greater uniformity of composition and strength in non-official remedies, and also to enable the medical profession to prescribe them with definite knowledge of those qualities, and without indicating any particular maker, the British Pharmaceutical Conference undertakes the preparation of a Formulary of Non-Official Remedies." This proposition was supported by a reference to what had been done by the Paris Pharmaceutical Association, and was seconded by Mr. S. R. Atkins. It was evidently in accord with the views of nearly all present, although the discussion made it apparent that a diversity of opinion existed as to the scope of

the proposed Formulary, some speakers wishing to limit it to formulæ for preparations of newly introduced drugs, and others evidently desiring that it should extend to the class of preparations represented by the illustration quoted by the President. One argument that told strongly in support of the motion was that it would give pharmacists an opportunity of proving their capability of rendering assistance in pharmacopœia construction. Eventually the resolution was passed *nemine contradicente*, and then, in order to give it practical effect, Mr. Williams moved the appointment of a committee consisting of Messrs. Greenish, Groves, Martindale, Symes, Thresh, Martin, Naylor, Maben, Abraham and Reynolds, with power to add to their number, to prepare a Formulary of Non-Official Remedies and to report to the Executive Committee, the sum of £25 being placed at the disposal of the Committee for expenses. This motion was also carried.

Nux vomica.—The reading of papers was then resumed, the next in order being a valuable communication by Mr. N. H. Martin, of Newcastle, in which he gave the results of the examination of a large number of preparations of nux vomica, obtained from various sources, undertaken with a view to ascertain to what extent the new Pharmacopœia processes are followed in making these preparations, and whether the object sought in fixing an official standard is attained by these processes. Out of 25 samples of tincture of nux vomica 11 were separated as presenting evidence by their color of having been prepared direct from nux vomica seeds; the alkaloidal strength of these samples ranged from ·119 to ·288 per cent., 7 of them being below the official standard. The 14 samples that appeared to have been prepared by dissolving the extract in a mixture of spirit and water, ranged in alkaloidal strength from ·196 to ·313 per cent., no less than 10 of them being in excess of the official strength and some considerably so. Mr. Martin is therefore of opinion that uniformity of alkaloidal strength is not attained by the Pharmacopœia process, even when it is followed, and that the tendency towards excessive potency may be attended by danger and inconvenience. Only 4 samples of extract had been examined which varied in alkaloidal strength from 15 per cent. of total alkaloid to 16·8. But Mr. Martin's principal objection is that as there "exists no relation between the amount of extractive and the amount of total alkaloids in any samples of nux vomica," the Pharmacopœia process practically results in a preparation which is in such an unstable condition that to call it a standardized preparation misleading. The variation in the consistency of the standardized extract was confirmed in the discussion that followed the paper, by Mr. Conroy and others.

Ethyl nitrite.—Mr. John Williams then read a note on the preservation of ethyl nitrite, in which he stated that in continuing his endeavors to prepare a solution of ethyl nitrite which would not decompose by keeping he had found the use of glycerin gave very promising results in preventing the rapid decomposition of nitrous ether as well as hydrocyanic acid, and he promised on a future occasion to report how far his expectations were realized. He exhibited samples of glycero-alcoholic solutions containing 17 per cent. of ethyl nitrite and less. Upon pouring the stronger solutions into water more or less violent effervescence was caused by the escape of the gaseous nitrite, the highest strength

with which effervescence did not take place being the solution containing 2½ per cent.

The Conference then adjourned for luncheon.

Belladonna liniment.—Upon resuming, the last sitting commenced with the reading of a paper which might be looked upon as a criticism from a manufacturer's point of view of the new Pharmacopœia process for making belladonna liniment. In making the liniment strictly according to the official directions Mr. Ransom has found that in order to obtain the 30 fluid ounces of final product 54 ounces of rectified spirit had to be used; further the fineness of the powder proved inconvenient when working on a large scale. The process was therefore varied by percolating a No. 20 powder until 40 fluid ounces of spirit had been used and then pressing the marc. In this way 30 ounces of liniment were obtained of almost identical alkaloidal strength with that prepared by the official process, but with a saving of 14 fluid ounces of spirit. Some other experiments were directed to testing the statement made in a footnote to the process in the Pharmacopœia of 1885 to the effect that improved exhaustion requires the increase of spirit as compared with the quantity ordered in the previous edition. Practically it was found that the liniments prepared by the two processes were equal in alkaloidal strength. The next point sought to be determined was the extent to which by the present official process for belladonna liniment the alkaloids are removed from the root. It was found that the exhaustion was far from complete, being 71 per cent. of the total alkaloids in one case and 63 per cent. in another, but that the exhaustion was more complete from the richer root. The experience of the author leads him to favor the standardizing of this preparation. Mr. Ransom also criticizes the official description of the root as favoring the omission of young roots which are relatively rich in alkaloid.

Salol, or salicylate of phenol, a new antiseptic which is attracting considerable attention just now, was the subject of a communication from Mr. J. Moss. The first portion of the paper was devoted to the useful purpose of a *réchauffé* of the description of this compound and the claims that have been put forward on its behalf. Most of this information was practically the same as appeared in previous notes. (See August number, p. 380). It was further mentioned that Professor Von Nencke's supposition that the decomposition of salol in the duodenum after passing unaltered through the stomach is due to the pancreatic ferment is incorrect, it being in fact due to the alkalinity of the liquid. Mr. Moss has indeed found that the saliva is sufficiently alkaline, though of course only to a small extent. The latter part of the paper recorded the author's failure to manufacture the compound.

Terebène.—The next two papers read were on the subject of the quality of so-called "pure terebene." The first, which was by Mr. W. Lascelles-Scott, gave the results of the examination of fifteen samples, from which it appeared that he considered only two samples were entitled to be spoken of as good, most of the others giving indications of having undergone oxidation by formation of peroxide of hydrogen and consequently yielding on evaporation various quantities of resin. One sample which was credited with having caused a cutaneous eruption gave as much as 2·10 per cent. of resin. The second paper, by Mr. John Hodgkin, dealt with the impurity of "pure terebene" as indicated by the polarimeter. Proceeding upon the assumption that American turpentine is usu-

ally used in the preparation of terebene and taking 18° 6′ as the standard of rotation of this variety of turpentine, Mr. Hodgkin based his calculation as to the amount of unaltered turpentine in a sample upon the extent of its rotatory power, an essential character of pure terebene being, as is known, its absence of any effect upon a beam of polarized light. Nine samples, two of which were foreign, gave results indicating the presence of unaltered turpentine, calculated upon this assumption, varying between 3.2 and 61 per cent. of unaltered material. One of the samples giving the best indications according to this test was described as having "a slight smell of turpentine," whilst another sample said to have a "pleasant" odor gave indications construed to show the presence of 32.9 per cent. of unaltered turpentine. It was objected to this test that American turpentine is not constant in its rotatory power, but Professor Armstrong remarked that the variety showing the greatest deviation from the standard comes from Savannah and is relatively small in quantity, so that, on the whole, American turpentine is fairly uniform in this respect. Some little amusement was caused when, upon Mr. Moss stating that he had based his process for the manufacture of terebene upon the published researches of Messrs. Armstrong and Tilden, Professor Tilden declared that the outcome of their research was to prove that no definite body corresponding to that originally described as terebene existed; but the apparent contradiction will be understood in the light of a remark by Mr. Allen that the name was applicable even if it were only to a mixture of hydrocarbons obtained by the molecular modification of turpentine until it no longer was capable of exercising a rotatory power on polarized light.

Emetine.—In some notes on the estimation of emetine, Mr. H. W. Jones spoke favorably of Flückiger's method for assaying ipecacuanha, which consists in exhausting the finely powdered root with chloroform containing a trace of ammonia (see *Am. Phar. Journ.* 1886, p. 127), and weighing or titrating the residue after evaporation. The author stated that the alkaloid is removed in this way in an unaltered condition, but he agreed with Mr. Alcock (*Phar. Jour.*, xvi.), that the chloroformic residue is only imperfectly soluble in acidulated water, and said he therefore preferred to treat it with water and dilute sulphuric acid, filter through cotton wool and recover the alkaloid with chloroform and ammonia. In respect to the titration with Mayer's reagent, by experiments with pure emetine Mr. Jones has found that in faintly acid solutions the most exact indications are given when the dilution is in the proportion of about 1 in 530; but as the error appears to increase regularly with the degree of concentration, he has constructed a table of factors for correction of results. Mr. Jones also corroborates the opinions which have been expressed that the amount of emetine in good ipecacuanha does not greatly exceed 1 per cent., and attributes higher results that have been recorded to the action upon the reagent of substances other than emetine that have been taken up by the solvent employed. Other experiments referred to, went to show that emetine undergoes alteration in treatment with lime, or even when subjected to heat alone on a water bath, increasing slightly in weight, and then giving in acidulated water highly colored solutions.

Vinum ipecacuanhæ.—A paper, by Mr. J. C. Shenstone, gave the results of some experiments made to compare the behavior of samples made with natu-

ral wines with and without various additions, and with artificial substitutes of known composition. The experiments have not afforded very decisive indications, beyond confirming the generally received opinion that the changes in the preparation are brought about by constituents in the wine used as well as atmospheric oxidation. The presence of sugar and of glycerin appeared to exercise a retarding influence on the precipitation, and Mr. Shenstone suggests a formula in which wine is replaced by a corresponding quantity of alcohol and water, with the addition of 10 per cent. of glycerin and 0.5 per cent. of malic acid.

A variety of musk derived from the "musk rat" (*Fiber Zibethicus*) has been the subject of various notices in Canadian and United States journals during the last few years (see *Amer. Phar. Journ.*, 1881, p. 397), and has been suggested as a possible substitute for the more expensive variety of musk for various purposes in perfumery. Dr. Symes reported to the Conference the result of an examination of some of this American musk, from which it appeared that as at present met with it had the disadvantage of being contaminated with matter having a rancid odor, but it was suggested that this might perhaps be avoided by proper precautions taken at the time of collecting the musk. Dr. Symes also described a process for exhausting the pods of their odor.

Iodoform.—The remaining four papers were then briefly summarized by the honorary secretaries in the absence of the authors. A note by Mr. Dott on iodoform was a defence of a statement made by him last year as to the extent of the volatility of iodoform, which has been questioned by Dr. Vulpius. Mr. Dott reiterates his statement that the average volatilization of iodoform at 100° C. amounts to 6·7 per cent. per hour, and appears to think that the different result mentioned by Dr. Vulpius was probably obtained at the more indefinite and lower temperature of a water-bath.

Cinchona.—In the next paper Mr. David Hooper communicated some of the results obtained in the course of his quinological work in the Madras cinchona plantations. Shaving cinchona trees as a method of harvesting bark is now very general, but the question as to the limit to the constant and successful shaving of the tree is not yet fully understood. It has been found that when operating on trees of six years old the increase in the amount of quinine during the first and second renewal at intervals of twelve months was most satisfactory, but the increase was not so marked in the third year renewal, although the conclusion arrived at is that renewal by shaving might be permitted for at least four years. The beneficial effect of renewal by shaving was very marked in the case of a six-year old succirubra, which yielded twice as much quinine sulphate as from a natural succirubra of twice that age; but the operation was not satisfactory in its results when applied to trees of sixteen to twenty one years, as such old trees will not bear the shaving treatment. The application of cattle manure to cinchonas seems, from the results of three sets of experiments on succirubra and magnifolia trees, to have the effect of increasing the amount of total alkaloids, and in two instances the amount of quinine, by 52 per cent. and 20 per cent. respectively; but the usefulness of the application of manure was not so marked in old trees, and it is believed that the effect of manuring would be more apparent in Crown and Ledger barks. It is also stated that the maximum yield of quinine in Ledger and succirubra barks seems to be attained when

the trees are between the age of five and six years, as after that time there is no sensible increase in the amount of quinine. Another point ascertained was that bark which had been kept for ten months in a damp room, and had become mouldy in consequence, had not deteriorated as regards the amount and quality of the alkaloids.

Cinchona cultivation in South America was the title of a paper by Mr. David Howard, who believes that it is to other countries than Ceylon, which occupies at present the most prominent position of all the countries where cinchonas have been cultivated, that we must look for the solution of the scientific points involved in the cultivation of cinchonas, owing to the little care that has been taken in Ceylon to avoid the danger of hybridization. Unfortunately, very little scientific information can be obtained from South America, the natural home of the cinchonas, except what little can be derived from the study of the cultivated bark which reaches us from that country. Among the cinchonas under cultivation in South America are two new species, *C. Thomsoniana*, named after Mr. Thomson, who discovered it in the Central Cordilleras, the home of the well-known *C. lancifolia*, and another discovered by Señor Pombo in Ecuador. *C. Thomsoniana* gave an analysis of the bark of a two-year old tree 3·3 per cent. quinine sulphate, trace of cinchonidine, and 0.55 per cent. cinchonine. The bark from the other species of the same age gave 5·7 per cent. quinine sulphate, 0·43 per cent. cinchonidine, with no cinchonine or quinidine. The improvement brought about by the successful cultivation of the cinchonas is further shown by the results obtained from the same plantations in 1872 and 1881 of the several kinds of cinchonas grown in Jamaica, and these results were even more favorable in the cultivation in Columbia of descendents from the Jamaica plantations. In the case of a succirubra cultivation in Columbia from a Jamaica plant the bark yielded as much as 7·0 per cent. quinine sulphate, with only 1·9 per cent. cinchonidine, and 0·67 per cent. cinchonine, and Mr. Howard remarks that this succirubra is one of the finest he has tested. In Mr. Howard's opinion it cannot be too clearly borne in mind that the prospect of future profits in the cultivation of cinchonas depends entirely on the cultivation of the high testing bark, for in the face of the importation of such highly valuable cultivated bark from Bolivia, as well as from Java, the profitable growing of inferior bark is impossible.

Compound spirit of ether.—The next paper was a characteristic note by Mr. Dott on this preparation which has recently received an official rehabilitation; it wound up with the following not very complimentary conclusions:—(1) That the Pharmacopœia directions for its preparation admit of a very variable result; (2) that the process consists principally in the preparation of ether, and its evaporation into space; (3) that though this extravagance could not be grudged if it resulted in a product of extraordinary potency, there is no evidence to show that ethyl sulphate or its congeners are of such a nature; and (4) that the introduction of this preparation appears to be a step backwards.

The business of the Conference having been so far concluded, resolutions of thanks were passed to the local committee, to the officers and professors of Mason's Science College, to the retiring general secretary, Mr. Plowman, and to the president.

The election of officers for the ensuing year was decided by the presentation of a single ballot paper, and no opposition having been offered it was declared to have been completed, the President chosen for next year being Mr. S. R Atkins, of Salisbury.

The other members of the executive committee are—

Vice-Presidents, M. Carteighe, F.I.C., F.C.S., London; S. Plowman, F.R.C.S., London; C. Symes, Ph.D., Liverpool; G. S. Woolley, Manchester.

Treasurer, C. Umney, F.I.C., F.C.S., London.

Honorary General Secretaries, J. C. Thresh, D.Sc., F.C.S., Buxton; W. A. H. Naylor, F.C.S. London.

Other Members of Executive Committee, W. Elborne, Manchester; A. W. Gerrard, F.C.S., London; T. Maben, Hawick; J. E. Brunker, M.A., Dublin; R. H. Davies, F.I.C., F.C.S., London; D. B. Dott, F.R.S.E., Edinburgh; T. Barclay, Birmingham; M. Conroy, F.C.S., Liverpool; W. H. Symonds, F.C.S., F.R.M.S., London.

Local Secretary, F. B. Benger, F.C.S., Manchester.

Auditors, C. J. Arblaster, Birmingham; W. Wilkinson, Manchester.

Incidentally it was mentioned that the attendance at the Birmingham meeting had been larger than at any previous meeting of the Conference, no less than 187 members' names having been recorded on this occasion, while the actual number of visitors present was probably much in excess of two hundred, so that the varied attractions of the Midland Metropolis as a place of meeting were evidently well appreciated.

At the close of the proceedings on Wednesday afternoon, conveyances were again prepared to take the members to Gillott's Steel Pen Works, and a large number availed themselves of this opportunity of inspecting one of the most interesting industries of Birmingham. Another party went to the exhibition at Bingley, and afterwards they drove to the Botanical Gardens. In the evening there was a musical and social meeting at the Grand Hotel, and festivities were kept up until an advanced hour in the night.

On Thursday, September 2, an excursion was had to Stratford-on-Avon, Leamington, Warwick and other points of interest in Warwickshire.

We cannot close these remarks without again calling attention to the conversazione, held on Monday evening, as having proved a very happy innovation upon previous usage. The greater facilities thus afforded for personal intercourse between the members are of especial value in regard to the objects which the Conference has in view, and it would be desirable if possible to make those facilities for conversation even greater still. It might indeed be useful for that purpose to curtail the periods of meeting now devoted to the reading of papers, and many papers might be read in a more abbreviated form for the purpose of employing some of the time available in the more profitable manner we have mentioned.—*Phar. Jour. and Trans.*, Sept. 4, 1886.

Isocicutine.—Bochefontaine (*Medical Chronicle*, June, 1886), has observed that its action on frogs closely resembles that of curare, and that warm-blooded animals die with symptoms of respiratory paralysis. It has not yet been used therapeutically.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The readers of the JOURNAL will remember that only five years ago (See AMER. JOUR. PHAR., 1881, pp. 258 and 374) this College, then enlarging its buildings, built a new chemical laboratory to meet the necessities of the class work. The increasing demand for space, particularly on the part of advanced students, has led the trustees of the College to make, during the past summer, extensive additions. Appropriating a three-story building belonging to the College, they have remodelled, enlarged and connected it with the present laboratory.

On the ground floor there are, 1st, a well lighted quantitative laboratory, fitted with water and gas for each table, vacuum pumps and special tables for organic analysis and distillation; 2nd, a commodious balance room, and 3rd, a fume closet, provided with conveniences for evaporation, distillation, &c.

On the second floor are, 1st, a reagent room, provided with shelves for all classes of chemicals; 2nd, a waiting room and retiring room for the female students, a number of whom are availing themselves of these laboratory facilities. On the third floor is a room for the storage of glassware and other apparatus.

The whole building is independently heated by a furnace in the cellar, and ventilation and drainage have been carefully provided for.

The erection of this building is largely in answer to a demand for laboratory facilities for women, many of whom have shown a desire to pursue plant analysis and other lines of advanced chemical work; the provision is, therefore, primarily for them. At the same time it allows of the pursuit of special investigation on the part of advanced students from the other laboratory. It is hoped from time to time to present the readers of the JOURNAL with the results of work done in this new laboratory.

The first apprentice examination (see August number of the JOURNAL) was held September 15th, when four of the applicants were deemed qualified to enter upon the study of the art of pharmacy. It is the intention to hold such examinations whenever a sufficient number of applicants have applied. Blank forms for application and further information may be obtained from the Actuary of the College.

The Chicago College of Pharmacy has announced that for the ensuing course of instruction, complete tickets will be furnished to students for the sum of fifty dollars, which includes all the laboratory instruction during the course 1886-1887.

The Cincinnati College of Pharmacy, at its meeting held August 10th, has ratified an arrangement made with the Cincinnati University, to become the Pharmaceutical Department of said University. The College retains its name and the control of its own affairs the same as before, and gains the advantage that its students have the right to receive instruction in any

branch taught in the academic and scientific departments of the University, for which they are prepared, free of charge.

School of Pharmacy of the University of Michigan.—Alviso B. Stevens, Ph. C., has been appointed for the lectures on pharmacy, following the resignation of Assist. Prof. T. J. Wrampelmeier. Mr. Stevens is well known as a pharmacist at 33 Lafayette Avenue, Detroit; graduated in pharmacy at Ann Arbor in 1875; was President of the Detroit Pharmaceutical Association for several years after its organization, and is one of the officers of the Michigan State Association.

The North Carolina Pharmaceutical Association held its seventh annual meeting August 11th and 12th, in Library Hall in Fayetteville. The address of the retiring president, H. R. Horne, and the reports of officers, committees and of the State Board of Pharmacy were presented and discussed. Resolutions were passed favoring the election of the Board of Pharmacy by the Association; in favor of placing the financial affairs of this Board into the treasury of the Association, and in favor of a rebate by the government on alcohol used in medicine or the arts, and of the abolition of the special tax as liquor dealers on druggists who sell alcohol only.

In a paper read by Mr. Nadal, a formula for elixir of pyrophosphate of iron, quinine and strychnine was given; and Mr. Calloway read a paper giving the results of the assay of various samples of *Fowler's solution*, showing deficiency of arsenical strength in several which in some cases appears to be due to the presence of calcium sulphate as an impurity in commercial white arsenic; it is advised that this preparation should always be made by the apothecary.

Mr. A. W. Rowland, of Wilson, was elected president; F. W. Hancock of Newberne, B. E. Sedberry of Fayetteville, and J. D. Croom of Shoeheel, vice-presidents; J. C. Munds of Statesville, secretary; and A. S. Lee of Raleigh, treasurer. The next meeting will be held in Asheville on the first Wednesday of August, 1887; W. C. Carmichael, local secretary.

The Tennessee Pharmaceutical Association was organized at Nashville, August 10th, adopted a constitution and by-laws and elected, for president, R. H. Gordon, Nashville; vice presidents, F. W. Scruggs, Memphis, and J. A. McCampbell, Knoxville; secretary and treasurer, J. T. Lellyett, Nashville. Various committees were appointed, and steps were taken for contesting before the Supreme Court a decision of Chancellor Merritt, requiring all druggists to take out a liquor dealer's license of $350 per annum; also, for having the "special merchants' license act" of 1882 so modified by the Legislature as to relieve those druggists who confine themselves to the sale of liquors for medicinal purposes. The next meeting will again be held in Nashville.

The Wisconsin Pharmaceutical Association met at its seventh annual meeting in Fond du Lac, August 11th, and listened to an address by the mayor, the annual address by the retiring president Prentice, and the reports of

the officers and committees, among the latter one from Professor Power, on "Adulterations." A number of papers were read and discussed. The officers for the ensuing year are: F. M. Givens, Fond du Lac, president; R. D. Pulford, Mineral Point, and W. M. Edwards, Portage, vice presidents; W. P. Clark, Milton, treasurer, and E. B. Heimstreet, Janesville, permanent secretary. The next meeting will be held at Milwaukee on the second Tuesday of August, 1877; A. Conrath, local secretary.

OBITUARY.

In three weeks the Philadelphia College of Pharmacy lost two of its faithful members. Wm. C. Bakes, Ph.G., class 1855, died August 29th, in Ocean Grove, and Dillwyn Parrish, Ph.G., class 1830, died in Philadelphia, September 18th. The Committee on Deceased Members will doubtless report more fully upon their services; for the present we note in the following the action taken by the Board of Trustees:

This Board having learned with deep regret of the decease, on the 29th of August, of their fellow-member and secretary, WILLIAM C. BAKES: Therefore,

Resolved—That we place on record our sense of the loss sustained by us and by this College in the death of our fellow-member. Mr. Bakes has served this Board for a long course of years as its secretary, filling the position with faithfulness, and to the entire satisfaction of its members. The zeal and energy manifested by him in the performance of the duties assigned to him; his judgment ripened by long experience in conducting the commencements and other public duties assigned to him were so well appreciated, that we reposed in confidence on his management on such occasions. So identified did he feel with this Board from long participation in its membership, that he continued his services as secretary after removing to Ocean Grove, although his labor and loss of time was much increased thereby. While called upon to mourn the loss of a valued member and friend, in the prime of life, it is with gratification that we can turn to his record as one which will do honor to his name and memory.

The members of the Board of Trustees of The Philadelphia College of Pharmacy, assembled in special meeting to-day, September 20, to consider the propriety of an expression of feeling upon the death on September 18th, of DILLWYN PARRISH, late president, and life-long member of this College: *Do resolve*–To have placed upon the records of the College a sense of profound sorrow, and of the high and generous esteem with which we valued his counsel, and his personal association. Possessing in a marked degree, all those traits which gave greatest value to human character, he impressed their influence upon his connection here and upon us.

Eminently discreet and wise in all his views governing the policy of this institution, he, in common with other esteemed counsellors, (the majority of whom have now passed from life) has given to The Philadelphia College of Pharmacy, a name, honored and distinguished among the institutions of this country.

THE AMERICAN
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NOVEMBER, 1886.

MEMOIR OF PETER WILLIAMSON.

Read before the Philadelphia College of Pharmacy, at a Stated Meeting, September 27, 1886.

Peter Williamson, one of the original members associated in founding the Philadelphia College of Pharmacy, deceased at his residence on Pine street, in this city, on the 6th of March, 1886, in the ninety-first year of his age.

The parents of Peter—Jesse and Mary Williamson—came to Philadelphia from Bucks county, his father pursuing the occupation of a carpenter and builder. He deceased in 1853, leaving what was then considered as a large estate, as evidence of his success in business. He was a member of the religious society of Friends, and highly esteemed.

Peter Williamson was born in Philadelphia, September 6, 1795, receiving his education at a Friends' seminary. He was led by inclination to learn the business of a druggist, and engaged with John W. Bryant, whose store was located at Second and Pine streets.

At the early age of eighteen years he entered into partnership with Dr. Joseph Klapp, whose store was at the northeast corner of Second and Almond streets. Dr. Klapp had an extended practice in his profession, and Peter a natural adaptation for the dispensing business. The firm of Klapp & Williamson soon became prosperous, and continued for many years the leading retail drug store in the old district of Southwark. Dr. Klapp retired from the firm in 1828, and the business was continued by Mr. Williamson. Adding to his large retail trade the specialty of medical supplies for shipping, and a manufacturing and jobbing trade, the demand for a larger store and increased facilities induced him in 1836 to erect the store at 710 South Second street and the dwelling adjoining.

In 1845 he associated with him in business his son Jesse Williamson, Jr., under the firm name of Peter Williamson & Son. After

the decease of his father (in 1853) Peter retired from the firm. His son Jesse deceased in 1854, and the business was purchased by Mr. James L. Bispham, who continues it at the old stand.

The connection of Mr. Williamson with this college dated from its first inception. He acted as secretary to the meeting of druggists which assembled in Carpenter's Hall, February 21, 1825, and was a member of the committee then appointed to report upon the subject of instruction of druggists in the science connected with their profession.

This committee having reported adversely to the acceptance of the proposition made by the trustees of the University of Pennsylvania, and recommending the establishment of a school of instruction entirely devoted to the requirements of druggists, the Philadelphia College of Pharmacy was the outgrowth, and was incorporated by the Legislature of the State, in March, 1822. Mr. Williamson does not appear from the record to have taken an active participation in the affairs of the college, his name appearing but once among the officers—as first vice president, to succeed Prof. Procter, who deceased in February, 1874. After holding this position one year he resigned on account of his age and entire withdrawal from active participation in business and scientific pursuits. Notwithstanding this seeming inactivity, it was well known that he was deeply interested in the prosperity of the college, which was evidenced by his presence at the meetings, and the annual commencements.

In March, 1874, he founded the first scholarship in the college, conveying to the trustees the sum of $500, the annual income from which was to afford tuition to a worthy applicant of means insufficient to bear the expenses of the college course. A number of young men now actively engaged in the pharmaceutical business will remember with gratitude the forethought and liberality which has enabled them to commence business with a capital—in the form of knowledge—which they would not have otherwise possessed.

In private life Mr. Williamson was highly esteemed by all of his acquaintance; his genial manner and social disposition attached to him a large circle of friends. For many years he was an active member of the Masonic order, and held the positions of Grand Treasurer and Grand Master of the order in the State of Pennsylvania. He was an active member of the old Volunteer Fire Department, and for many years President of the Hope Hose Company.

He was one of the founders of the Southwark Dispensary, and active in many good and charitable works. For twenty years he was Rector's Warden of Trinity P. E. Church, Southwark, and one of its corporate members. The consistent Christian life of Mr. Williamson extended beyond the period usually allotted to man. Venerable in years, and in the duties of a long life, his record will remain with us as an enduring monument to his memory.

LIQUOR MAGNESII BROMIDI.

By Joseph W. England, Ph.G.

(Read at the Pharmaceutical Meeting, October 19th.)

Under this name an aqueous solution of magnesium bromide has originated, and been employed in the Philadelphia Hospital, more particularly in the insane department of that institution, with such success as to warrant its more general trial and employment. Drs. Henry, DaCosta and Brooke, of this city, have each employed it in insane practice, and found it to be a decided sedative in its action upon the nervous system, having no unpleasant after effects and evincing, in a number of instances, a cathartic action. As the subject may be a matter of pharmaceutical interest and inquiry in the future, I desire to communicate to you the formula I originated, which is as follows:—

Take of

Acid. Hydrobromic. Dilut. (U. S. P., 1880), 1 pint.
Magnes. Carb. 9.5, to neutralize (or about one troy-ounce).

Filter.

Each teaspoonful contains 7 (exactly 6.97) grains of anhydrous magnesium bromide. Dose: One to two fluidrachms.

A sample of the solution as thus prepared, is here presented. You will observe that it is a clear, transparent, light-yellowish liquid; odorless, bitter, and brackish in taste. Specific gravity 1·122, miscible with alcohol in equal volumes without precipitation, and remaining unaltered upon exposure to air. One fluidounce of the solution, precipitated with a slight excess of sodium carbonate, and then ignited, should yield not less than 12 grains of magnesium oxide (corresponding to at least 55·76 grains of magnesium bromide).

The chemical reaction upon which this process is based, is as follows:

$$10HBr + 4MgCO_3.MgH_2O_2.5H_2O = 5MgBr_2 + 11H_2O + 4CO_2$$
808 484 918 198 176

Now as each fluidounce of water weighs 455.66 grains, the same volume of dilute hydrobromic acid of the pharmacopœia, having a specific gravity of 1·077, should weigh 490.75 grains; and as the solution contains 10 per cent. of absolute acid, one fluidounce then contains 49.075 grains of available HBr.

Then if 808 parts of anhydrous HBr, as shown in the equation above, yield, on neutralization with magnesium carbonate, 918 parts of magnesium bromide, 49.075 parts of anhydrous HBr should give 55·76 parts of magnesium bromide (or exactly 6·97 grains to each fluidrachm).

If 808 parts of anhydrous HBr require for neutralization 484 grains of officinal carbonate of magnesium, then 49.075 parts should require less or 29·4 parts (or 1 pint of officinal hydrobromic acid would require 470·4 grains of officinal magnesium carbonate).

The usefulness of magnesium bromide, in its acceptability and decisive action, seems to reside in the fact that it contains a larger percentage of combined bromine than any other bromide, with the exception of the lithium compound, as the following table of percentages of combined bromine, in various bromides, will show:

	Formula	Mol. Wt.	Per Cent.
Nickel bromide	$NiBr_2 3H_2O$	271·6	58·76
Potassium "	KBr.	118.8	67.17
Zinc "	$ZnBr_2$	224·5	71·09
Iron "	$FeBr_2$	215	74·23
Sodium "	$NaBr$	102·8	77·62
Calcium "	$CaBr_2$	199·6	79·95
Ammonium bromide	NH_4Br	97·8	81·59
Magnesium "	$MgBr_2$	183·6	86·92
Lithium "	$LiBr$	86·8	91.93

The main advantage of preparing the solution by this method over others, is the constancy in strength of the resulting product, arising from the fact that pure hydrobromic acid of pharmacopœial strength is readily obtainable. The difficulty of making magnesium bromide by granulation and preparing the solution direct, is that on evaporation of the solution, a grayish, pasty mass is left, excessively hygroscopic in nature, which, on continued application of heat to induce thorough dryness, is, according to Balard, who gives the hydrated compound the formula $MgBr_2 6H_2O$, decomposed into HBr and

MgO. Serullas found, on the other hand, that the anhydrous salt was fusible at red heat without decomposition; while Löwig discovered on distilling the aqueous solution that HBr was given off.

Another consideration in favor of the first method is the cost, which is one-half less than when prepared by direct solution of the granulated bromide. The impracticability of preparing it by double decomposition between magnesium sulphate and calcium bromide may here be mentioned and resides in the difficulty of obtaining a product of constant strength, through the variable quantity of water of crystallization in the one, and absorbed moisture in the other. The high cost of metallic magnesium effectually precludes the utilization of direct combination of the elements.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Sodium rhodanate has been found by Dr. Paschkis (Schmidt's Jahrbücher, April, 1886), to have an action similar to that of strychnine, but less rapid, producing in frogs prolonged tetanic convulsions with inhibition of the respiratory and cardiac movements. Injected into the arteries of mammals, a marked increase in the blood pressure is produced.

The salt referred to is the *sulphocyanide, sulphocyanate* or *thiocyanate* of sodium, and is prepared by neutralizing thiocyanic acid with sodium carbonate, evaporating the liquid carefully by the aid of a water bath or over sulphuric acid, and recrystallizing the dry residue from alcohol. The salt forms white or colorless rhombohedric crystals, which are very deliquescent and freely soluble in water and in alcohol. Its composition is expressed by the formula NaSCN. The aqueous solution does not produce any precipitate with baryum chloride; it imparts to ferric salts a deep blood-red color which is not affected by hydrochloric acid, but disappears on the addition of corrosive sublimate.

Potassium sulphocynate is more generally met with than the sodium salt, and may probably have the same, or at least an analogous action. As early as 1818, A. Vogel (*Schweigger's Journal*, xxiii), called attention to the poisonous narcotic effects of the potassium salt.

Bromide of Arsenic is given by Dr. Davis to diabetics in doses of

from three to five drops, the diet being strictly regulated at the same time. Under this treatment the sugar disappears rapidly from the urine; but it is recommended that the administration of the remedy be afterward continued for several weeks. (*Jour. Amer. Med. Asso.*, May.) Dr. Moock (*France Méd.*, Feb. 1886), has used this arsenic preparation with success in similar cases. Notices of this solution will be found in AMER. JOUR. PHAR., 1883, pp. 143 and 225.

Salicylate of iron is given by Dr. Braithwaite (*Brit. Med. Jour.*, July 17, 1886), in infantile diarrhœa accompanied by fetid stools. The solution of the salt is prepared extemporaneously by dissolving separately in water 20 grains each of ferrous sulphate and sodium salicylate, mixing the solutions, adding 3 or 4 drachms of glycerin, and diluting with water to 3 fluidounces. This is given in hourly doses of a teaspoonful until the stools become black, when the same dose is repeated every three or four hours.

Calcium Santonate is prepared, according to Heldt, by digesting calcium hydrate with santonin in alcoholic solution, until the red color has disppeared, evaporating the filtrate at a moderate temperature, exhausting the dry residue with water and concentrating. The salt forms white satiny crystalline crusts, is permanent in the air and sunlight, has an alkaline taste and reaction, and is soluble in water and in alcohol. The compound has recently been recommended as possessing anthelmintic properties without being absorbed in the digestive tract. The dose is 1 grain.

Calcium hippurate is highly recommended by Poulet in the uric acid diathesis, and is stated to be useful in scrophulous complaints, incipient cirrhosis of the liver and in struma. The dose is 10 grains. For the preparation of the salt, Liebig recommended the aqueous solution of hippuric acid to be heated with calcium carbonate; the filtrate yields on concentration, glossy scales or oblique rhombic prisms, which have the composition $Ca(C_9H_8NO_3)_2.3H_2O$, are soluble in 18 parts of cold and 6 parts of boiling water, and lose at 100° C., the water of crystallization amounting to 12 per cent.

Dr. Dujardin-Beaumetz (*Union Méd.*, August, 1866), orders the salt extemporaneously prepared by dissolving 1 part of hippuric acid in 25 parts of lime water and adding an equal bulk of syrup; the dose is a tablespoonful.

Sal Alembroth or *ammonio-mercuric chloride* is now largely used by Sir Joseph Lister for dressings, the solution used for rendering ban-

dages, lint, etc., aseptic being prepared of 1 part of the double salt to 100 parts of water, colored by a little aniline blue, 1 in 10,000, the latter becoming reddish on coming in contact with an alkaline discharge.

From the accounts published in medical journals the pure double salt seems to be used, prepared by sublimation. This has the composition $NH_4Cl.HgCl_2$, and may be obtained by subliming a mixture in molecular weights of ammonium chloride, 53·4, and mercuric chloride, 270·5. Davy found that the sublimate usually contains a little calomel and hydrochloric acid from partial decomposition. When the mixture of the two salts is crystallized from water, the double salt is obtained either anhydrous in rhombohedrons, or in long silky needles containing $1H_2O$. Lister's solution, however, can be readily made from the salts by dissolving 21 grains of ammonium chloride and 100 grains of mercuric chloride in 12,100 grains ($27\frac{5}{8}$ oz. av., or $26\frac{5}{8}$ fluidounces, U. S. measure), and adding $1\frac{1}{4}$ grains aniline blue.

The British Pharmacopœia directs a *liquor hydrargyri perchloridi* prepared from 10 grains each of mercuric chloride and ammonium chloride, and 1 Imperial pint—8750 grains of distilled water. This solution contains the *Sal alembroth* of the alchymists; but when this is evaporated and the dry residue is heated, the sublimate is not of uniform composition, since the ammonio-mercuric chloride volatilizes at a temperature much higher than those at which ammonium chloride or mercuric chloride sublime. The double salt $(NH_4Cl)_2.HgCl_2$, is decomposed by heating it to sublimation and the sublimate is not of uniform composition.

Narceine has been successfully employed by Dr. Brown-Séquard (*Gaz. hebd. de méd. et de chir.*), in doses of $\frac{1}{2}$ to 1 grain, as an expectorant in bronchitis accompanied by profuse viscid expectoration.

The spontaneous transformation of morphine into apomorphine is reported in the *Brit. Med. Jour.*, June 26, 1886. A solution of morphine hydrochlorate, which had been employed subcutaneously, eleven months later, was found to be violently emetic, and was ascertained to contain apomorphine. Such solutions should be kept on hand only for a few weeks.

A case of Cocaine poisoning, causing deafness and loss of vision, motion and sensation, was rapidly relieved by Dr. Schilling, through the inhalation of nitrate of amyl. (*Centralbl. f. d. ges. Ther.*, Feb. 1886.)

Antipyrine appears to be a valuable hæmostatic, and according to Chéron (*Revue des mal. d. femmes*) to be preferable to iron solutions and to ergot as a local application in uterine hæmorrhages, a 4 per cent. solution being usually of sufficient strength.

Atropine santonate is recommended by Bombelon for its non-irritating mydriatic action, 1 drop of a 1:200 solution producing dilatation of the pupil, lasting for nearly twenty-four hours.

Antineuralgic liniment. Guéneau de Mussy recommends for this purpose a mixture of oil of peppermint 4 parts, tincture of aconite root 2 parts and chloroform 1 part.

Wilkinson's Ointment, according to Hager, contains *Beguin's spiritus sulphuris*, prepared from washed sulphur 1 part and stronger ammonia 6 to 8 parts with sufficient sulphuretted hydrogen gas until solution is effected. The ointment is a mixture of Beguin's liquor 1 part, prepared chalk two parts, and flowers of sulphur, lard and liquid tar of each 25 parts.

A modified formula has been used with advantage by Dr. Behrend in the Berlin Hospital for skin diseases, and is as follows: sublimed sulphur 8, liquid tar 8, soft soap 16, lanolin 16, and powdered pumice 5 parts.

Preparation of lanolin. F. Fialkowski (*Wiad. Farmac.*) recommends soaking sheep's wool in cold water for 24 hours, and afterward washing it well until the water remains clear. The wool is then boiled twice with water and pressed while hot, when the lanolin is obtained of a whitish color, much lighter than the commercial article. Twelve pounds of wool yielded 18 ounces of lanolin, or about 11 per cent.

A disinfecting powder, recommended by Sigmund (*Phar. Zeitung*), for the dressing of sloughing wounds and syphilitic ulcers, consists of beech tar or oil of cade 10 to 15 parts, powdered gypsum 100 parts.

Luminous paper has been prepared by incorporating paper pulp with 20 or 25 per cent. of phosphorescent powder, and adding a little gelatin.

Potassium permanganate has been found very serviceable by Züboff (*N. Y. Med. Jour.*, Oct. 2, 1886), as a local application for frostbite, a solution of 1 or 2 grains to the ounce of water being used; it relieves pain, allays inflammation and prevents suppuration in blisters. For burns a half-grain has been employed.

LABORATORY NOTES.

(Abstracts from Theses.)

Officinal extracts.—Francis J. Lammer, Jr., prepared the following extracts according to the directions of the *U. S. Pharmacopœia*, and determined the percentage yield of the finished products.

Extr. Aconiti	12·766 per cent.	Extr. Haematoxyli	5.3 per cent.
" Aloes aquosum	91·54 "	" Hyoscyami alcoh.	16·64 "
" Arnicæ radicis	19·53 "	" Iridis	8·9 "
" Belladonnæ alcoh.	32·23 "	" Juglandis	16·82 "
" Cannabis indicæ.	16·56 "	" Krameriæ	8·4 "
" Cinchonæ.	26·4 "	" Leptandræ	15·97 "
" Colchici radicis	23·2 "	" Malti	44·72 "
" Colchici seminis*	9·63 "	" Mezerei	7·1 "
" Colocynthidis.	15·135 "	" Nucis vomicæ	6.17 "
" " comp.†	95·77 "	" Opii	49·6 "
" Conii alcohol	10·73 "	" Physostigmatis	6·2 "
" Digitalis	25·5 "	" Podophylli	8.31 "
" Euonymi	18·31 "	" Quassiæ	2.24 "
" Gentianæ	44·6 "	" Rhei	25·66 "
" Glycyrrhizæ purum	25·32 "	" Stramonii	14·02 "
		" Taraxaci	11.3 "

Cerates and Ointments.—Jas. E. Buckley, Ph.G., suggests that the composition of ointments should be so regulated, that their fusing points be merely a little higher than the temperature of the body, both in health and disease. The following fusing points were ascertained by introducing the preparation into a glass tube of one-eighth-inch bore, suspending this with a thermometer in water, and applying heat until the plug changed its position in the tube; and by heating the preparation in a cup placed in a water-bath, and stirring with a thermometer until entirely liquefied, the fluid point was determined. The preparations were all made strictly in accordance with the *U. S. Pharmacopœia* of 1880. The results were as follows, the temperature being given in degrees Centigrade:

* Menstruum same as for the corresponding fluid extract.

† Loss in powdering 4.23 per cent.

	Fused.	Fld.	Congealed
Ceratum	56·6	60	55·5
" Camphoræ	57·7	62·7	53·8
" Cantharidis	61·1	71·2	54 4
" Cetacei	57·7	61·1	54·4
" Extr. Canthar.	70	72·1	61·2
" Plumbi subacet.	60	62·2	54·4
" Resinæ	51·1	54·4	48·8
" Sabinæ	52·7	53·5	51·6
Unguentum	52·9	53·9	51·1
" Acidi Carbol	51·9	54·4	59
" " Gallici	34·4	40·5	23·9
" " Tann	34·4	38·3	23·8
" Aquæ Rosæ	51·1	54·4	48·8
" Belladonnæ	34·4	38·8	23·8
" Chrysarob	34·4	38·8	23·8
" Diachylon	51·6	58·6	44·4
" Gallæ	34·4	40·5	23·8

	Fused.	Fld.	Congealed
Ung. Hydrargyri	45·0	51·6	44.4 / 29·4
" Hydrar. amm.	33·8	38·8	23·8
" " nitrat.	47·2	50	31·1
" " oxid. fl.	52·7	60	46·6
" " " rub.	50·5	54·4	42·2
" Iodi	33·8	37·7	23·3
" Iodiformi	35·5	39·4	23·8
" Mezerei	50	52·2	48·3
" Picis liq	41·6	47·2	40·6
" Plumbi carb	33·8	40	23·8
" " iod	33·8	40	23·8
" Potas. iod	42·2	44·4	31·1
" Stramonii	41·1	44·3	28·3
" Sulphuris	45·5	50·5	28·3
" Sulph. alkal	38·8	49·4	26·1
" Veratrinæ	39·4	46·5	34·4
" Zinci oxid	40	44·2	34·4

Ointment of Boroglyceride.—Clarence E. Downes, Ph.G., states such an ointment is made in the Jefferson Hospital by heating one part of boroglyceride, containing 50 per cent. of boric acid, and while hot, adding it slowly to three parts of petrolatum, the stirring being continued until the mixture has thoroughly cooled, in order to avoid separation of the ingredients. The ointment is a very convenient vehicle for atropine, physostigmine, chloride of zinc and other remedies.

Unguentum Zinci Oxidi.—Jos. P. Williams, Ph.G., recommends a somewhat firmer ointment than the officinal. It is made by triturating 5 oz. of oxide of zinc with 4 oz. of glycerin until a smooth paste is obtained. Then melt 1 oz. of white wax, add gradually 15 oz. of benzoinated lard, keeping the temperature near 140° F.; now stir until the mixture begins to thicken, add the zinc oxide prepared as before, and continue the stirring until thoroughly mixed and perfectly smooth.

Troches.—After experimenting with various excipients for troches, Ellsworth S. Adams, Ph.G., observes that currant paste deserves to be more frequently used, and that a jelly prepared from starch and gum arabic furnishes one of the best general excipients. Powdered gum arabic and starch, of each 1 oz., are well mixed, triturated with 3 fluidounces of water, and the mixture heated to boiling until solution has been effected.

A lozenge useful in diarrhœa was prepared from powdered opium

12 grains, tannin 50 grains, aromatic powder 250 grains, and sufficient of the starch excipient, the mass divided into 12 lozenges.

Pepsin and Bismuth.—With the view of testing the asserted incompatibility of pepsin and bismuth salts, Harry K. Kroh, Ph.G., made a number of experiments regarding the digestive action of pepsin in the presence of bismuth salts. The ammonio-citrate of bismuth is unsuited for preparing clear solutions with pepsin. Bismuth subnitrate was found to somewhat retard, but not otherwise interfere with, the digestion of albumen in the presence of hydrochloric acid, added in the usual proportions. Mixtures of 1 pepsin, 10 bismuth subnitrate, 50 hard-boiled albumen, 500 water and 8 hydrochloric acid left only 3 parts of the albumen undissolved at the time when, in the control experiment without bismuth salt, the albumen had been completely dissolved. The best method of administering the two remedies is in the form of mixtures, using the subnitrate of bismuth and directing the mixture to be shaken.

Cinchonidine Sulphate.—Seven samples of this salt were examined by Thos. J. Backes, Ph.G., and found to be pure, except one, which left 6·6 per cent. of ash, consisting of magnesium compound. The loss of water by exsiccation at 100° C., varied between 8·2 and 11 per cent.

Honey.—Chas. S. Commings, Ph. G., states that honey gathered from white clover, basswood and raspberry is of a light color and has a delicious flavor; but the bees will not gather it from white clover as long as it can be gotten from other plants. Considerable honey is also found in the blossoms of fruit trees, of the maple, locust and other plants. Buckwheat honey is considered inferior, it being darker in color and less agreeable in flavor than that procured from many other plants.

Honey may be kept from crystallizing or candying by suspending the vessel containing it in water, applying heat, and stirring the honey constantly, until the water is heated to the boiling point, when the vessel is taken from the fire, the scum removed, and, after cooling, the honey is placed in jars or other suitable vessels, tightly covered and kept in a cool cellar. Treated in this manner, Mr. Commings has kept honey from twelve to sixteen months without crystallizing.

Menthol Pencils cannot be made with the addition of thymol, chloral or camphor, all of which cause the menthol to liquefy at ordinary temperatures, producing, even on the addition of an equal bulk of spermaceti, a mass too soft for compression into a definite

shape. Some of the commercial menthol pencils consist of pure menthol, melt at 44° C., are freely and completely soluble in hot alcohol, chloroform, ether, carbon bisulphide and oil of peppermint, and on being gently heated are completely volatilized. Wm. G. Nebig, Ph. G., has found the pencils of three manufacturers to be always of this behavior, and to consist of pure menthol.

The product of four other manufacturers contained between 30·5 and 69·25 per cent. of paraffin, began to melt between 39° and 41°C., and was completely liquefied at from 43° to 59° C. These cones were soluble in benzin, benzol, carbon bisulphide, chloroform and fixed oils; also in boiling alcohol, a white mass being deposited on cooling.

The cones from another manufacturer, No. 8, after having been repeatedly treated with hot chloroform, left behind a white crystalline powder, which was inodorous, very bitter, of neutral reaction, soluble in water and alcohol, and with strong sulphuric acid turned blood-red, showing it to be salicin, amounting to 37 per cent.

Occasionally the cones of the last five manufacturers were found to consist of pure or nearly pure menthol; this is attributed to the low melting point of menthol, and to the difficulty of uniformly mixing large amounts of it with the other substances, owing to the volatility of the former.

Fuchsin was recommended by H. Zeise (see Am. Jour. Phar., 1867, p. 320) as a test for the presence of alcohol in certain volatile oils. Jas. P. Mallon, Ph. G., has examined the behavior of aniline red to the volatile oils of bergamot, cajeput, caraway, cinnamon, citronella, cloves, coriander, cubeb, juniper, lavender, lemon, myrcia, neroli, pennyroyal, peppermint and sassafras, and found it to be soluble in all the oils named in sufficient quantity to communicate its color. The oil of peppermint had been recently distilled and was known to be pure; it was freed from water by treatment with calcium chloride and rectification, when it was not colored by aniline red, but in about twenty minutes this was seen to become soluble in the presence of 1 per cent. of alcohol; in the presence of 5 per cent. or more of alcohol the oil at once became pink and rapidly of a deeper color.

The effect of dehydration and rectification was not tried with the other oils mentioned above. It may be noted here that Zeise found the oils of cubeb and sassafras, among several others, to be unaffected by fuchsin, and that these and other oils tested had been prepared by himself.

A NEW PROCESS FOR THE PRODUCTION OF THE ALKALINE METALS.

By Hamilton Y. Castner, of New York.

Abstract of a paper read before the Chemical Section of the Franklin Institute, October 12, 1886, communicated by the author.

The process which I employ consists in reducing either the hydrate or carbonate of an alkali, when in a fused state, at moderate temperatures, by the use of the carbide of a metal or its equivalent, whereby an excess of carbon is avoided and the use of lime is rendered unnecessary. The reducing substance, due to its composition and gravity, remains below the surface, and is therefore in direct contact with the fused alkali. By the equivalent of the carbide of a metal, I mean a mechanical compound of carbon and metal from which the metal cannot be separated, excepting by the aid of acids or intense heat. Such a compound I produce by coking a mixture of tar and iron (previously reduced in a fine state of division, by carbonic oxide or hydrogen). From experience, such proportions of tar and iron are used, as will produce, when the mixture is coked, a heavy mass of metallic coke, having about the composition of iron seventy per cent. and carbon thirty per cent, equivalent to the formula FeC_2. This mechanical compound, after being ground, is ready for use and consists of fine particles of iron coated with carbon, fully answering the purposes of a true carbide. I prefer to use caustic soda in the preparation of sodium on account of its fusibility, and with it mix such quantity of the so-called "carbide," that the carbon contained in the mixture shall not be in excess of the amount theoretically required to reduce all the soda to sodium, according to the following reaction:

$$3\ NaHO + FeC_2 = 3Na + Fe + CO + CO_2 + 3\ H,$$

or to every 100 pounds of pure caustic soda, fifteen pounds of "carbide," containing about twenty-two pounds of carbon, is added. The treatment of this mixture is carried on in large cast-iron crucibles in a furnace, the general arrangement of which are as follows: The heating space of the furnace is divided into separate chambers, the dimensions of the same depending upon the size of the crucibles to be heated, and the number of these compartments are in proportion to the capacity of production desired for the furnace. An aperture is provided in the bottom of each chamber, through which the crucible may be raised by mechanical means into its position in the furnace.

The necessary cover for the crucible is fixed stationary in each chamber, and from this cover projects the tube to the outside of the furnace into the receptacle for the condensation of the metallic vapors. When operating, the crucibles are charged with the mixture, made as before described, placed upon the lift, which is situated directly below the aperture made in the bottom of the chamber, and raised into the furnace. The edges of the covers are made convex, while the edges of the crucibles are concave, so that when the crucibles are raised the edges come together and, being held from below, form a tight joint, preventing the exit of gas and vapor, excepting through the tube provided from the cover. Gas, which is used as a fuel in connection with heated air, is allowed to enter the chamber, after the crucible containing the charge is in place, and the reduction and distillation commences as soon as the crucible contents have reached the temperature of 1000° C., the sodium being reduced in the crucible and distilled therefrom into the condenser, by passing through the tube projecting from the crucible cover. As soon as the operation is finished, the crucible is lowered and a new one, containing a fresh charge is raised in its place, while the crucible just removed is cooled, cleaned and recharged. The appliances, which hold the cover in place, are so arranged that the cover may be removed whenever necessary without interrupting the process, which is practically continuous. By avoiding the careful mixing and calcining of ingredients preparatory to charging the cylinders, and in carrying out generally the mechanical part of the old process, the details of which require the most careful management, the method just described will be seen to have many advantages. As the charge is fused, the alkali and reducing material are in direct contact, and this fact, together with the aid rendered the carbon by the fine iron, in withdrawing the oxygen from the soda, fully explains the chemical reasons why the reduction is accomplished at a moderate temperature. Furthermore by reducing the metal from a fused mass, in which the reducing agent remains in suspension, the operation can be carried on in crucibles of large diameter, the reduction taking place at the edges of the mass, where the heat is greatest and the charge flowing thereto from the centre to take the place of that reduced. By the old process, the heat required to penetrate to the centre of the refractory charge and reduce the soda there situated in addition to the heat absolutely needful to bring about reduction, necessitates the use of wrought-iron vessels, and even when

these are made small in diameter, which partially removes this great disadvantage of the method, the expensive cylinders are rapidly rendered worthless from the effects of the intense heat.

In doing away with the use of lime and an excess of carbon, the main causes which have hitherto prevented a full yield of metal are removed, and thus, with the aid of other advantages described, I am enabled to obtain fully ninety per cent. of metal instead of thirty per cent., as formerly. By the old process lime must be added to prevent fusion, to insure any reduction; yet, at the same time it forms, with a portion of the soda, the compound known as soda-lime, and from this substance carbon reduces sodium only at the most intense heat. In practice, according to the old method, four pounds of carbon are used to every nine pounds of sodium carbonate. This is twice the amount theoretically required to reduce all the sodium, even assuming the gas resulting from the reduction to be wholly carbonic-oxide. When, however, but one-third the total amount of sodium is all that is obtained from a charge, the proportion between the sodium produced and carbon used becomes as one is to six. The effect of an excess of carbon in the mixture, which, as previously explained, is really necessary, is to produce an excessive amount of carbonic-oxide, and this, together with the excess of carbon, combines with the metallic vapors of sodium, forming various compounds, from which the metal cannot be distilled. By reducing caustic-soda with the carbide of a metal, or its equivalent, and using only sufficient carbon to carry out the reaction stated above, the gases given off consist of hydrogen, carbonic-oxide and carbonic-acid, which mixture has little or no effect upon the vapors of sodium. The crucibles, after treatment, contain a small amount of carbonate of soda and all the iron of the "carbide" still in a fine state of division, together with a very small percentage of carbon. These residues in the crucibles are treated with warm water, and the solution of soda evaporated to recover the carbonate of soda, while the fine iron is dried, mixed with tar and coked to produce more of the so-called "carbide equivalent."

Boric Acid has been found by Dr. J. L. Minor, of Memphis, Tenn. (*N. Y. Med. Jour.* July 31, 1886), to be an efficient remedy, though not a specific, in granular lids. The powder is applied to the affected parts by means of a camel's hair brush from three times a week to three times a day, the difference depending upon both the individual and the disease.

GERMANIUM AND ITS COMPOUNDS.

Translated from *Chemiker-Zeitung*, 1886, No. 69, Page 1058,

By Geo. H. Ochse, Ph.G.

Germanium.—Most of the salts of germanium are very soluble, hence, solutions of these salts do not yield precipitates with reagents, or the precipitates when formed are dissolved by washing with water. By fusing the mineral (Argyrodite) with sulphur and carbonate of sodium, throwing into water and decomposing the resulting solution with acid, nothing but sulphur was obtained, whilst the filtrate when treated with sulphuretted hydrogen or other reagents, did not yield a precipitate. It was afterwards discovered that the germanium remained in solution with sodium sulphide, but was precipitated when the acid was added largely in excess. To free it from the accompanying sulphur the precipitate was treated with diluted ammonia, which dissolved the germanium sulphide together with traces of arsenic and antimony; by gradually adding hydrochloric acid, antimony and arsenic sulphides were precipitated in the order named, and by adding more acid to the filtrate snow-white sulphide of germanium was obtained. There is now no doubt but that germanium is the ekasilicium of Mendelejeff.

Argyrodite has a metallic lustre; when broken it is of a reddish color, becoming violet by age; opaque; hardness 2·5, sp. gr. 6·085 at 15° C., brittle, crystalline system monoclinic. When heated in glass tubes it yields a black sublimate resembling sulphide of mercury very much; by continuing the heat it fuses. The composition of argyrodite is as follows:—

Ag 74·72 per cent., Ge 6·93 per cent., S 17·13 per cent., Fe 0·66 per cent., Zn 0·22 per cent., Hg 0·31 per cent.

The effect produced by heating the mineral in a current of hydrogen is very characteristic, sulphuretted hydrogen being evolved and a dark glossy mirror of crystalline sulphide of germanium being formed, accompanied by a reddish-brown, pulverulent, amorphous sulphide of germanium, the residue consisting mainly of metallic silver. The process for obtaining germanium is as follows: Argyrodite is fused with an equal weight of a mixture of calcined soda and flowers of sulphur, the fused mass treated with water and the solution neutralized with sulphuric acid, which precipitates the sulphur together with the sulphides of antimony and arsenic; the filtrate is treated with

more acid to precipitate the sulphide of germanium. The precipitated sulphide of germanium is washed with dilute sulphydric acid, heated with concentrated nitric acid to form oxide, and reduced at a red-heat in a current of hydrogen. To reduce larger quantities, it is best to knead the oxide with from 10 to 15 per cent. of starch and boiling water to a paste, and moderately heating in a closed crucible. By this process germanium is obtained as a dark-gray powder. With borax it fuses into a regulus, fusing point = 600° C. It crystallizes readily, is very brittle, readily pulverized and breaks with a scaly fracture. Germanium has a bright metallic lustre, a greyish-white color, sp. gr. 5·469, is not affected by hydrochloric acid, but dissolves readily in nitro-hydrochloric acid. Nitric acid converts it into a white oxide, and by heating with concentrated sulphuric acid, sulphuretted hydrogen is evolved, a white sulphate, soluble in water, remaining. Concentrated solution of caustic potash does not affect it; with nitrates and chlorates deflagrating mixtures are formed. The atomic weight was obtained according to J. Volhard's method from the tetrachloride and found to be 72·32, corresponding with the results of Lecoq de Boisbaudran, who used another method, and states it to be 72·28. The vapor density of the chloride ($GeCl_4$), according to L. F. Nilson and O. Pettersson, in Stockholm, at 301·5°=7·43, and at 739° =7·44. Gustav Kobb found the spectrum to be very distinct and measureable; 1 line in orange, 1 in yellow, 4 in violet, and 12 in green and blue.

Combinations of Germanium.—Two oxides, 2 sulphides, 2 chlorides and 1 iodide are known. They do not color the flame of a Bunsen burner, nor do they yield a spectral reaction. Solutions of germanium salts are decomposed by many water-reducing metals, especially zinc, germanium being precipitated. Most compounds of germanium are easily reduced by means of reducing agents at a high temperature.

Oxides of Germanium.—Compact germanium retains its lustre when exposed to the air; at a red-heat it becomes coated with a thin layer of oxide, whilst powdered germanium when slightly heated begins to form oxide. Germanium protoxide is formed by decomposing the chloride ($GeCl_2$) with alkalies; the resulting hydrated oxide heated moderately in a current of carbonic acid, yields the gray-black monoxide. This is insoluble in dilute sulphuric acid, but dissolves readily in hydrochloric acid to form germanous chloride. This solution shows a characteristic reaction, and is an energetic reducing

agent; it converts chromic acid into chromium oxide, hypermanganic acid into manganous oxide, and precipitates gold solutions brown; from bichloride of mercury solutions it throws down first calomel then mercury, and bleaches litmus instantly.

Germanium dioxide (Germanic acid?), GeO_2, is formed by burning the element in oxygen, or by oxidation with nitric acid, or by roasting the sulphide. The pure oxide can be obtained by decomposing germanic chloride ($GeCl_4$) with water, but the yield is trifling. Germanic oxide is a dense white powder of specific gravity 4·703. One part of the oxide requires for solution at 20° C. 247·1 parts, at 100° C., 95·3 parts of water. The solution, when evaporated, yields small microscopic crystals. Carbon or hydrogen reduces it to germanium. Germanic oxide is sparingly soluble in acids, and possesses the characteristics of an acid, which accounts for the solubility in alkalies.

Sulphides of germanium are readily formed by passing vapors of sulphur over germanium at a red heat. Germanous sulphide, GeS, is formed by heating the disulphide with an excess of germanium in a current of carbonic acid. Germanic sulphide, when heated in a slow current of hydrogen, yields beautiful crystals. In close proximity to the heated portion, beautiful thin scales or feathery crystals, having a lustre resembling iodide of iron, are formed. Held up to the light, they are transparent with a bright-red or yellowish color, and form a brown-red powder when pulverized. When heated it fuses and volatilizes; heated in the air, it is converted into oxide. Solution of caustic potash dissolves it readily; hydrochloric acid precipitates amorphous, reddish-brown or orange sulphide; hot concentrated hydrochloric acid converts it into germanous chloride ($GeCl_2$). The crystalline sulphide is insoluble, the amorphous sulphide soluble, in sulphide of ammonium forming disulphide. Germanic sulphide (GeS_2) is prepared by precipitating a solution of germanic oxide with sulphuretted hydrogen, or by treating its sulpho-salts with an excess of acid, whereby a voluminous white precipitate is obtained; it is washed with dilute acid and saturated with H_2S. The acid is removed by washing with alcohol saturated with H_2S, then with ether, and drying in vacuo. Germanic sulphide is quite soluble in water; the aqueous solution, however, soon decomposes, emitting H_2S. The dry disulphide soon decomposes when exposed to a moist atmosphere, and, as a consequence, has a hepatic odor. Germanic sulphide is a

sulpho-acid, the natural salt being argyrodite. Alkali sulphides form with it soluble sulpho-salts, from which solutions of the heavy metals seem to precipitate insoluble sulpho-germanates.

Chlorides of Germanium.—Compact germanium takes fire, burning with a blueish-white flame and forming vaporous tetrachloride when heated in chlorine gas. Powdered germanium burns spontaneously in chlorine. Germanous chloride ($GeCl_2$) is obtained by passing gaseous hydrochloric acid over powdered germanium or its sulphide. Germanium dichloride is a thin colorless liquid, fumes when exposed to the air; the vapor colors cork intensely red. The low boiling point (about 72° C.), *i. e.*, lower than the tetrachloride, might possibly be due to the formation of a germanium chloroform ($GeHCl_3$), similar to the silicium chloroform, instead of the dichloride. A little water causes a dense white precipitate of oxychloride to fall. Germanic chloride ($GeCl_4$) is obtained chemically pure by mixing one part of powdered germanium with eight parts of bichloride of mercury and distilling at a moderate heat. The tetrachloride is a thin, colorless liquid of specific gravity 1·887 at 10°C.; it does not solidify at —20° C., boils at 86° C., fumes when exposed to the air, and is decomposed by water.

Germanic Iodide (GeI_4) is obtained by decomposing the tetrachloride with potassium iodide, or by direct combination of the elements. It has an orange color, yellow when powdered, fuses at 144° C., seems to boil between 350 and 400° C., is very hygroscopic and gradually forms white oxide when mixed with water.

No distinct reaction for germanium has as yet been found. The best test is the formation of the white sulphide with ammonium sulphide in alkaline germanium solutions on adding a large quantity of acid. In the course of analysis it follows in the arsenic, antimony and tin group.

Use of Fluorides.—Dr. J. Lucas, of Bombay (*Lancet*, May 22, 1886), has employed fluoride of ammonium in the treatment of enlargement of the spleen. Nausea was produced at first, but afterward large doses could be borne, and after a time the appetite improved. The nauseant and purgative effects are greatly lessened by giving the drug after meals. He thinks it has antipyretic and antiperiodic properties, and that it is the best known remedy for enlargement of the spleen. He began with five-minim doses, but is disposed to give twenty or even thirty minims, well diluted. He suggests that fluoride of iron might be preferable on account of its hæmatinic properties.—*N. Y. Med. Jour.*, June 12, 1886.

SALVE PENCILS AND PASTE PENCILS.

By Dr. H. C. Brooke.

Dr. P. G. Unna describes two forms of application to the skin by means of salve pencils and paste pencils, which have the advantage of being more convenient and more economical than those ordinarily in use. The *salve pencils* (*Salbenstifte*) are based on the model of the ordinary lip-salve pencils, and may, when suitably medicated (with zinc oxide, tar, chrysarobin, etc.), be rubbed quickly into any limited dry eruption of the skin, which thus becomes covered with a coating of hard ointment. The paste pencils were made after the idea of the nitrate of silver sticks, and are intended for use in those cases in which the epidermis is broken or destroyed, as in eczema, chancre, or the various forms of ulcer; also in such cases as condylomata, where the horny layer is thin and fatless, or where the surface is moist, as is the case with the mouth, anus, conjunctiva and urethra. By moistening the pencil and stroking it over the surface of the lesion, a thin paste layer of the medicament is left behind.

The basis of the salve pencils is composed of olibanum, resin, olive oil, wax, in varying quantities according to the nature of the medicament, with the addition of a little colophonium to give greater adhesive power. The medicaments employed may, of course, be any of those ordinarily made use of in ointments. The basis of the paste pencils is made up of starch, dextrin and white sugar, mixed with a small quantity of tragacanth. I have found them somewhat hard and scratchy, and think that they might be made much more useful if of softer consistence, for the idea is undoubtedly a good one.

I have used "salve sticks" or "salve pencils" regularly for some months before the publication of Unna's paper, and have found them a very valuable aid in treating limited skin eruptions, whether they are simply rubbed into the skin to serve as an ordinary ointment or rubbed in and the layer thus formed then covered over with impermeable plaster.—*Med. Chronicle*, August, 1886.

In addition to the foregoing abstract of Dr. Unna's paper, which appeared in the *Monatshefte f. prakt. Dermat.*, April, 1886, we select from the forty formulas published in the latter journal, the following as examples:

Stilus acidi salicylici dilubilis:

	10 p. ct.	40 p. ct.
Precipitated salicylic acid	10 parts;	40 p
Powdered tragacanth..	5 "	5 "
Powdered starch	30 "	10 "
Powdered dextrin	35 "	25 "
Powdered white sugar.	20 "	20 "

Stilus arsenico-sublimatus dilubilis:

Powdered arsenious acid	10 parts.
Corrosive sublimate...	5 "
Powdered tragacanth..	5 "
Powdered starch	30 "
Powdered dextrin	30 "
Powdered sugar	20 "

Stilus iodoformi dilubilis:

Iodoform	40 parts.
Powdered tragacanth..	5 "
Powdered starch	10 "
Powdered dextrin	30 "
Powdered white sugar.	15 "

Stilus ichthyoli dilubilis:

Sodium sulpho-ichthyolate	20 parts.
Powdered tragacanth..	5 "
Powdered starch	30 "
Powdered dextrin	35 "
Powdered white sugar.	10 "

Stilus saponatus kalinus dilubilis:

Anhydrous potash soap	60 parts.
Powdered white bole..	40 "

Stilus acidi carbolici unguens:

	10 p. ct.	30 p. ct.
Carbolic acid	10 parts;	30 p
Powdered olibanum	20 "	20 "
Yellow wax	40 "	50 "
Olive oil	30 "	— "

Stilus acidi borici unguens:

Boric acid	10 parts.
Yellow wax	40 "
Benzoinated olive oil..	35 "
Colophony	5 "

Stilus cantharidini unguens:

Cantharidin	0·5 parts.
Colophony	10 "
Yellow wax	45 "
Benzoinated olive oil..	45 "

Stilus creasoti:

Creasote	40 parts.
Powdered olibanum	20 "
Yellow wax	40 "

Stilus iodoformi unguens:

Iodoform	40 parts.
Colophony	5 "
Yellow wax	30 "
Olive oil	25 "

Stilus iodi unguens:

Pure iodine	20 parts.
Colophony	5 "
Yellow wax	40 "
Olive oil	35 "

Stilus plumbi oleatis et acidi salicylici unguens:

Precipitated salicylic acid	20 parts.
Lead plaster	40 "
Yellow wax	20 "
Olive oil	20 "

Stilus saponis, picis et ichthyoli unguens:

Anhydrous potash soap	10 parts.
Liquid tar	10 "
Sodium thioichthyolate	5 "
Colophony	5 "
Yellow wax	40 "
Benzoinated olive oil..	30 "

Stilus zinci sulphocarbolatis unguens:

Sulphocarbolate of zinc	5 parts.
Powdered castile soap.	15 "
Colophony	5 "
Yellow wax	40 "
Olive oil	35 "

AMERICAN MUSK.

By Charles Symes, Ph.D.

Read before the British Pharmaceutical Conference.

Some few years since several articles appeared in the Canadian and United States pharmaceutical journals, by Messrs. Christian and Gregory; these in turn were copied into European journals devoted to pharmacy, which created considerable interest in this substance. It was assumed that it would soon become an article of commerce and for many purposes replace the more expensive kind. With some little difficulty I obtained a supply, consisting of two thin, flexible, sheet-iron packages, each containing half a pound of the pods or follicles, of a flattened, oval shape, brown color, and smelling strongly of musk and rancid fat. (See also Amer. Jour. Phar., 1881, p. 397.)

The animal yielding "American musk" is known as the musk rat (*Fiber Zibethicus*), related to the beaver, is amphibious and abounds on the margins of rivers and lakes in the United States and Canada; it is trapped for its fur, and in directing attention to its musk follicles Mr. Christian was attempting to utilize a waste product.

Accompanying the supply which I obtained were the following particulars as to its mode of use:

"*For Toilet Soaps.*—Take one pound of the pods and bruise it with a portion of silex or glass, add four pints strong alcohol and 2 per cent. solution potash 6° B., and keep in a moderately warm place for three or four weeks. Such substances as civet, styrax, vanilla, benjamin; and such oil as cloves, caraway, serpolit and cassia are the usual additions to this musk in toilet soap, according to the kind wanted.

"*For Sachet Powder.*—Take one pound of the pods, place them in some convenient vessel with four pounds of powdered orris root (stirring occasionally) for two or three weeks, when the pods can be sieved out and used for tincture as above. The musk orris root can enter into musk, violet, and heliotrope sachets.

"*For Perfuming and Flavoring.*—Take one pound of the pod and mix with four pints strong alcohol, adding 2 ounces slaked lime to this quantity, and infuse about a month. For flavoring, the oils of rose, thyme, cloves, cinnamon and extract of vanilla are the usual accompaniments."

The sacs were found to be saturated with oil, and it became of in-

terest to determine whether the odorous principle resided in this or the tissues. Some portions were cut up and macerated several days in almond oil with occasional agitation, and on filtering it was found that the menstruum had taken up very little, if any, of the musk odor, whilst the rancid fatty smell was distinctly perceptible.

Ether dissolved out the oil, but carried with it some coloring matter and a little of the musk odor. A further quantity of 250 grains was cut up, laid between folds of stout, bibulous paper, and submitted to hydraulic pressure, when 25 per cent. of oil was readily separated; this, however, carried with it some brown extractive matter which possessed the musk odor, and it was evident that such a method could not be adopted in practice for separating the oil. It was subsequently found that bibulous paper with slight pressure possessed some advantages, and that this method was worth adoption.

Essence prepared with the use of calcium hydrate, as in the beforenamed formula, was partially freed from rancidity, but possesssed a peculiar pungency of its own, which seemed undesirable, and it readily became turbid, requiring to be filtered over and over again. In another experiment a little liquid ammonia was substituted for calcium hydrate, and that with decided advantage.

The sample marked "Essence two years old" was so prepared. In another bottle this essence is mixed with an equal quantity of lavender water, so that an opinion may be formed as to how far it is possible to use it in perfumery. It was found that if a small quantity only of ether were poured on the pods and poured off almost immediately, little of the musk odor was removed, and the pods were more readily acted on by the spirit with which they were subsequently treated; and further, that weak spirit dissolved less of the oil than strong spirit, but when rendered alkaline it took up quite as much of the musk odor. Reasoning on these and other facts, the following formula was deduced, and is, I believe, the most suitable for dealing with a somewhat unsatisfactory article.

Take 4 ounces of the pods, cut small and press gently between several folds of bibulous paper, wash lightly with about 2 ounces of methylated ether, pour off and allow the remaining ether to evaporate by a short exposure to the air; put into a wide-mouthed bottle with 15 ounces rectified spirit, 5 ounces distilled water, 20 minims liquid ammonia and $\frac{1}{4}$ ounce powdered animal charcoal; allow all to stand with occasional agitation for one month, and filter through magnesia.

A sample of essence so prepared and a sample of soap perfumed with it are shown. The musk odor is there, but still a trace of the rancidity remains, and I am of opinion that the remedy is chiefly in the hands of the trappers of the animal or the collectors of the pods. The musk odor is, I believe, a distinct secretion, and when quite fresh much of the oil could be removed without materially impoverishing the perfume value of the follicles; thus more care could be expended on their preservation, so as to avoid this strong, rancid, greasy odor, for, until this is done, the American variety is not likely to make much way against genuine Tonquin musk.—*Phar. Jour. and Trans.*, Oct. 2, 1886, p. 282.

SALOL: A NEW ANTISEPTIC.

By John Moss, F. I. C., F. C. S.

Read before the British Pharmaceutical Conference.

A few notes on a new antiseptic of promise will no doubt interest the members of the Conference.

Our information on salol is derived chiefly from *La Semaine Médicale*, April 14th, 1886, which reports a meeting of the Medico-Pharmaceutical District Society of Berne, held in that city on the sixth of the same month. M. Sahli introduced salol as a new anti-rheumatic and antiseptic produced by Professor von Nencki, and as possessing certain very decided advantages over other bodies having allied therapeutic characters.

It is perhaps hardly correct to speak of salol as a new antiseptic. It is rather an association, a combination indeed, in which are concerned two well-known antiseptics, salicylic acid and phenol. It is somewhat startling to be told that phenol is an ether which is playing the *rôle* of a base, and that the compound is salicylate of phenol. We should be disposed to assume that M. Sahli's remarks on these points are misreported, and that salicylate of phenyl was intended, were it not that the word salol is evidently compounded of the initial and terminal letters of the former title.

Salol is a white crystalline coarse powder, rather like damp table salt. The odor is very marked, and is identical with that of oil of wintergreen, which is chiefly salicylate of methyl ($CH_3C_7H_5O_3$). When taken into the mouth, a fainter impression of the smell is received on the palate, and the taste of carbolic acid is just suggested. It is very

sparingly, if at all soluble in water at 60° F. It dissolves in proof spirit, more readily in stronger spirit, and is precipitated on dilution, a permanent emulsion being formed. The solution has no effect whatever on litmus.

Salol melts at 106° to 108° F., forming at a slightly higher temperature a clear white liquid like carbolic acid. If it be melted under water and shaken till cool, the original condition of a coarse crystalline powder is restored.

It dissolves readily in caustic soda solution, and on addition of acid in excess the liquid becomes milky, oily looking drops are visible, and the smell of carbolic acid is noticeable. When the liquid is only slightly acid, the addition of a nearly neutral solution of ferric chloride produces the purple coloration indicative of salicylic acid.

The advantages which are claimed for salol over salicylate of soda, for which it is proposed as a substitute, are dependent first of all on its insolubility in water and the juices of the stomach, and secondly on the ease and completeness with which it is decomposed after passing the pylorus. Being insoluble in water it is free from the repellant and nauseating effects of salicylate of soda which some patients find so objectionable that even syncope has sometimes supervened on ingestion. Passing through the stomach unaltered it undergoes decomposition in the duodenum, where it comes into contact with the pancreatic juice and is broken up into salicylic acid and phenol. Professor von Nencki claims that this change is due to the pancreatic ferment, but a simple experiment suffices to show that so highly organic a secretion is not essential to produce the effect referred to. The pancreatic juice is alkaline in character and I find that the addition of a few drops of solution of soda brings about the decomposition, so that the further addition of ferric chloride is followed by the characteristic purple coloration. The action of the soda takes place very slowly in the cold, more quickly when gently warmed. The liquid must be neutral or slightly acid for the color to be produced, though much acid discharges it. The best effect is obtained by digesting salol in solution of soda at 100° F. for an hour, pouring off the clear liquid, adding slight excess of hydrochloric acid and diluting, then adding a dilute solution of ferric chloride. No coloration whatever results when salol is heated with an acid instead of alkali previous to the addition of ferric chloride.

Now the salivary secretion also is alkaline and if alkali is the only

essential factor in the analysis of salol, it ought to happen that digestion with saliva should lead to the purple coloration with ferric chloride under the conditions already laid down, and this in fact is what occurs. The saliva is so slightly alkaline, however, that the amount of salol decomposed is correspondingly minute and the coloration very faint. The weak taste of salol is therefore accounted for.

Having passed the duodenum the salicylate and phenate of alkali, which are slowly produced as the gut is followed, are in condition to exercise their respective antiseptic powers, and to be absorbed into the circulation. They are voided as urate of salicyl and as sulphophenol.

So far as I know, the process of manufacture of salol has not been made public. I have tried to produce it by dissolving salicylic acid in excess of carbolic acid with the aid of a gentle heat, but have not succeeded in getting the whole of the salicylic acid so combined as not to give the purple coloration at once with ferric chloride. It seems not improbable that it should be formed by treating with hydrochloric acid at an earlier stage in the manufacture of salicylic acid. As you know, when the carbonic acid gas is brought into the presence of carbolate of sodium in the retort, a molecule of the former is absorbed with production of a molecule of salicylate of sodium, and a molecule of carbolic acid, which distils away. If the mixed salicylate of sodium and carbolic acid or, better, carbolate of sodium be treated with hydrochloric acid, the following equation would probably represent the decomposition:—

$$NaC_7H_5O_3+NaC_6H_5O+2HCl=$$
$$C_6H_5C_7H_5O_3+2NaCl+H_2O.$$

Chemically speaking, salol is salicylate of phenyl. The possibility that it is phenylsalicylic acid, of which the formula would be $HC_7H_4(C_6H_5)O_3$, is contra-indicated by its indifference to litmus, though the latter view receives support from the slow rate at which the compound is decomposed by soda, as well as from the observation that after the decomposition is effected the addition of hydrochloric acid, under ordinary conditions, is not followed by the re-formation of the original compound. I am aware that the latter fact apparently disposes of the suggestion just made as to the manufacture of salol, but it must be borne in mind that the effects of high temperature and pressure on two bodies set free in presence of each other cannot be disregarded.

Salicylate of phenyl contains 36 per cent. of phenyl, corresponding to 44 per cent. of carbolic acid. Sahli says that salol contains not

less than 38 per cent. of phenol; but seeing that his account did not concern itself chiefly with the chemistry of this new compound, a little latitude of expression is admissible.

Sahli claims that more carbolic acid may be ingested as salol without unpleasant secondary effects than in any other way. The dosage of salol being 30 grains three or four times a day, 12 grains of phenol are exhibited in every dose, and the freedom from irritation and other unpleasant local effects may be attributed to the slow rate at which salol is decomposed under the action of the intestinal juices.

For the present it remains only to state what are the various ailments in which Sahli has used salol with good effects. He has used it in all rheumatic affections, in chronic urticaria, in sub-orbital neuralgia, as an antipyretic, in diabetes, in intestinal catarrh, in typhoid fever, in cholera, against intestinal parasites, in catarrh of the bladder, in ozœna, in otorrhœa, as a local application in gonorrhœa, and as a mouth wash.

Since the above was written I have learned from Messrs. Kühn & Co., who represent the manufacturers in England, that the latter, Messrs. Durand and Huguenin, are not in a position to state how salol is made. The probability is that the process is entirely secret, and not the subject of a patent.—*Phar. Jour. and Trans.*, Oct. 2, 1886, p. 273.

TURMERIC ROOT, AND ITS COLORING MATTER.

By C. J. S. Thompson.

Turmeric root is still of interest to us, as it appears in the appendix of the last edition of the Pharmacopœia, for the preparation of the tincture, and paper, of turmeric.

Of the different varieties of the plant, which grow largely in moist districts of the East Indies, the *Curcuma longa* and *Curcuma rotunda* are perhaps the most useful. These are both the production of the same plant, the latter being the central rhizomes, and the former the elongated lateral ones.

The first is more especially used in the East, for its medicinal and aromatic properties; the latter being mostly employed for its coloring properties as a dye. They differ, however, very little in their composition.

The official rhizome, the *Curcuma longa*, is bent and knotty, being in pieces about the size of the little finger, and covered with a thin,

grey bark, on which there are slight rings; though that met with in commerce has usually a yellowish appearance, owing to the pieces of the root becoming rubbed one against the other.

Under the bark is a hard, heavy and compact substance of a deep orange-yellow color, the fracture resembling that of wax.

The root has the odor of ginger, and a warm, bitter and somewhat acrid taste, owing to its oil; it imparts to the saliva a yellow color.

The powdered root was formerly given medicinally as an excitant, and was reputed to act as a diuretic, the dose given in old Pharmacopœias being from twenty to forty grains. It is largely used in India and China in the arts as a dye, and also as an aromatic condiment, it being one of the ingredients in curry powder.

The root contains a small percentage of volatile oil, resin, brown extractive matter, starch and gum. The following represents the results of an analysis:—

Yellow volatile oil	1
Brown extractive matter	12
Resin	10
Gummy matter	13
Soluble matter in alkaline solution	57
Moisture, etc	7
	100

The root also contains from two to three per cent. of curcumin, $C_{14}H_{14}O_4$, a yellow coloring matter, which is soluble in oils, alcohol and fatty liquids, but very slightly so in cold water. It is easily dissolved in an alkaline solution, and turns a deep brown. Jackson and Menke (see Am. Jour. Phar., 1882, p. 398), who investigated curcumin very exhaustively, found it to be a diatomic monobasic acid. When treated with weak oxidizing agents it was found to yield vanillin. They succeeded in producing the following products from curcumin, by the action of nascent hydrogen, and of bromine: Curcumin dihydride, an anhydride of curcumin dihydride, tetrabromo curcumin, curcumin tetrabromide, and pentabromocurcumin dibromide.

The brown color given to turmeric paper by alkalies depends considerably on the strength of the alkaline solution employed.

Dilute acids will restore the paper to its original color.

The powdered root when treated with cold water yields to it a little of the coloring matter, enough to impart a dark yellow tint.

Hot water takes up a little more, although it does not dissolve the whole of the coloring principle.

Cold alcohol acquires a yellow color, and dissolves a quantity of the resinous matter, but hot alcohol dissolves out much more, and assumes a dark reddish-brown color.

If this alcoholic solution be evaporated, and the residue again acted on by ether, the ether will dissolve out the whole of the yellow coloring matter.

If the solutions are evaporated and dried, a resinous matter of a deep brown color will remain.

The simplest method of extracting curcumin is to macerate the powdered root in boiling water, until the liquid ceases to acquire any further tint. Then boil the residue in alcohol. The root is thus nearly exhausted, although the powder always remains more or less colored.

Mix the solutions, which should be of a reddish-brown color, and filter. The filtrate, on evaporation, yields a brown mass, which should be dissolved in ether, and again slowly evaporated, when the curcumin will remain in thin transparent layers.

When carefully dried, and reduced to a fine powder, it is of a rich yellow color, having the odor of vanilla. It melts at a temperature of 50° C., and even at ordinary temperature the powder, if fine, becomes soft and forms into a mass.

On exposure to sunlight it gradually loses its color and becomes nearly white. It burns with a bright flame. Curcumin is insoluble in water, but soluble in ether, chloroform and alcohol. Insoluble in dilute acids, but soluble in strong. With strong sulphuric acid it forms a solution of a crimson color, which disappears if water is added, and the curcumin is precipitated in yellow flakes. When treated with hydrochloric and phosphoric acid it acts in the same manner, but with acetic acid no change in color is produced.

On adding some boracic acid to an alcoholic solution and evaporating, it gives a beautiful crimson powder. With acetate of lead the solution gives a dark red precipitate, and with nitrate of lead a yellow precipitate. Nitric acid has a peculiar action on curcumin.

If one part of curcumin is mixed with 2 parts of nitric acid and same quantity of water, on the application of heat a rapid action takes place accompanied by a brisk ebullition. If still kept at a gentle

heat till the ebullition ceases, a resinous mass separates out which subsides, and a yellow soluble substance remains in the water.

The resinous substance when dried forms a fine yellow powder which is quite different from curcumin in composition and odor.

The yellow substance, which is soluble in water, crystallizes in transparent needles.—*Phar. Jour. and Trans.*, Aug. 14, 1886, p. 123.

THE DISCOVERY OF THE MYDRIATIC ACTION OF THE SOLANACEÆ.

By Dr. Rud. Kobert.

Professor of the History of Medicine and Pharmacology in Dorpat, Russia.

There can be no doubt that the discovery of the mydriatic action of certain Solanaceæ was a matter of great importance for therapeutic practice. Nevertheless, there exists a singular uncertainty, if not confusion, as to the time of this discovery and as to the discoverer himself. In fact, there is not a single book published in German, French, or English, in which I can find reliable data in regard to this matter.[1]

In order to mend this defect, I beg leave to gather for a historical discussion all pertinent material, which, as may be presumed, is no light task.

The Greeks and Romans understood by mydriasis a condition of visual weakness, together with a dilatation of the pupil. This definition can be found in Paulus Ægineta (iii., 22),[2] Celsus (vi., 6), and Isagoges; and is probably derived from the peculiar condition of visual weakness and pupillary dilatation invariably to be found in glaucoma. Some few authors, as Aëtius, designate improperly, also, other pathological conditions of the eye, such as phthisis bulbi, as mydriasis. In the presently accepted meaning—*i. e.*, dilatation of the

[1] The statements of A. Hirsch in the "History of Ophthalmology" (Graefe-Saemisch, "Text-book of Ophthalmology," vol. vii., p. 235) appearing to be more trustworthy than those of other authors, have been adopted in the main in this paper.

[2] This interesting passage is rendered by Adams as follows: When the pupil does not appear changed in color, but much wider than natural, and when it sometimes wholly impairs the vision, and sometimes nearly so, and when every object appears smaller, the affection is called mydriasis. The cause of it is some redundant humor.

pupils[1]—the word appears to have been first used by Cælius Aurelianus ("Chron.," ii., p. 344).

The first mention of a mydriasis produced by preparations of Solanaceæ[2] we find in Galen's third volume of "Methodus Medendi" (Edit. Kühn, tom. x., Lipsiæ, 1825, p. 171). This author states, in the second chapter of the quoted volume, that grave visual interferences and mydriasis may result by a too intensive local application of drugs containing mandragora or hyoscyamus. Dioscorides and Plinius Secundus do not appear to have known anything of this action, at least these writers never mention it, while mydriasis itself occurs in Pliny, who even mentions an artificial production of mydriasis by the seeds of anagallis. Galen, therefore, is unquestionably the first author who refers to the mydriatic action of two species of Solanaceæ. Still, his in every way correct statement appears to have been wholly forgotten, for no subsequent writer ever speaks of this action, which fifteen hundred years later had to be discovered anew.[3]

In 1686, Dr. Ray, a famous English physician, reported in his "Historia Plantarum" (vol. i., p. 680) that a lady coming under his observation had placed upon a small ulcer beneath the eye a belladonna leaf, and had afterwards been annoyed by an excessive dilatation of the pupil. Simultaneously the lady lost entirely the power of the pupil to react on light. The physician regarded this defect at first as a matter of accident, until a repetition of the belladonna application taught him that a dilatation of the pupil and loss of reactive power for several days were the physiological effects of belladonna.

But this second discovery also was again forgotten, although Ray's work was largely read. Thus Boerhave (1668–1738), however familiar with medical literature, says in his book, "De Morbis Nervorum" (p. 371), expressively that the juice of belladonna had no influence upon the eye, while Van Swieten, in his commentary of Boerhave's "Aphor-

[1] The word pupil, with its present signification, was used by Cicero ("De Natura Deorum," ii., 57), who derived it from pupula, a little doll.

[2] The identification of the Solanaceæ of the ancients is a difficult and as yet but partially solved problem, *vide* Sprengel ("Ped. Dioscorides de Mat. Med.," Lipsiæ, 1829, pp. 602–605), Francis Adams ("Paulus Ægineta," London, 1847, ii., pp. 218–219, and iii., p. 293), and Imbert Gourbeyre ("Recherches sur les Solanums des Anciens," Paris, 1884). For our purposes it is of importance to know that all of the species in question have a mydriatic action.

[3] Ebn, Baithar, and Paulus Ægineta, know positively nothing of this action.

isms" (vol. iii., p. 363), quotes Ray's case. And quite independently of Ray's observation, Evers reported in the *Berliner Sammlung*, 1773, vol. v., p. 565,[1] that he noticed in six persons hebetudo oculorum and dilatatio pupillæ as symptoms of the belladonna intoxication. Evers must accordingly be mentioned as the third discoverer of the mydriatic power of belladonna. Three years later the following case of poisoning occurred at Hamburg. A physician of repute, Dr. Reimarus, had ordered in a drug store belladonna. The nephew of the apothecary, Johannes Andreas Daries ("De Atropa Belladonna," Dissert. Inaug. Auctore Petro Joanne Andrea Daries. Lipsiæ, 1776. Reprinted in Ballinger's "Sylloge," vol. ii., p. 58), who prepared the prescription from the fresh plant, had a drop of the juice of the berries, or of the herb, accidentally get into his right eye. Very soon after this accident he was troubled by mydriasis and considerable visual interferences. Reimarus, informed by letter of the druggist's trouble, wrote that he was aware that the ingestion of large quantities of belladonna produced mydriasis, but that he was surprised to learn that the external application of the drug could likewise produce this result. This was, however, Reimarus added, a very interesting matter, and invited decidedly to therapeutic trials of the drug in cataract operations. But even before the arrival of this letter, Daries ascertained, by experiments on a cat, that the fresh juice of the herb and of the berries of belladonna had actually a mydriatic power. Hence Daries is to be designated as the fourth discoverer of the mydriatic action of belladonna.

About the same time, or a little later, Doederlein[2] observed in his practice a case recalling that one of Ray mentioned above. A patient having placed a leaf of datura stramonium upon an ulcer near the eye was soon affected with a complete paralysis of the pupil. Doederlein interpreted this mydriasis very correctly as the action of stramonium, and is accordingly to be regarded as the fifth discoverer of this

[1] Gmelin states in his "General History of Vegetable Poisons" (Nuremberg, 1777), p. 301, that already in 1765 he had noticed mydriasis as one of the symptoms of belladonna-poisoning, but he does not appear to regard this symptom as characteristic, but rather as an incidental one, for, in reviewing all symptoms, he omits this one.

[2] Conrad Moench, "Lehre von den Arzneimitteln," Marburg, 1795, p. 357. Moench, by the way, was quite familiar with the publications of Ray and Daries.

action. Independently of him, Schiferli,[1] following the example of his preceptor Loder, who appears to have found the belladonna action for himself, used and recommended in 1796 an infusion of belladonna for cataract extraction. Loder is consequently the sixth discoverer of this action.

After this time the specific action of belladonna upon the eye became generally known in Germany and other countries.

Thus we find it mentioned as something generally known in Trommsdorff's "Pharmacological Dictionary" (Hamburg and Leipzig, 1802, vol. i., p. 299). The action of hyoscyamus was discovered by Himly, in 1800, from botanical deductions, and was warmly recommended for ophthalmological purposes.[2] Ehlers,[3] one of his pupils, translated the publication of Himly in question into French, but, either on purpose or by mistake, always wrote belladonna instead of hyoscyamus, inducing thus the French physicians to employ belladonna therapeutically. In the second French edition, however, appearing 1803 in Altona, the word jusquiame is used instead of belladonna. In England Paget[4] recommended the belladonna application for cataract extraction.

In lay circles, however, the mydriatic action of the Solanaceæ was in the beginning of this century still wholly unknown, and was anew discovered by Runge, the discoverer of the aniline colors. This chemist makes, in his "Chemischen Briefen,"[5] the following interesting communication:—

"In Jena I became soon acquainted with Döbereiner, and discussed with him my researches about vegetable poisons, especially the Solanaceæ. Döbereiner appeared pleased with the methods instituted by me and the results of my investigations; he constantly stimulated me

[1] Rud. Abraham Schiferli, "Dissertatio de Cataracta," Jenæ, 1796; and "Theoretical Practical Treatise on Cataract," Jena and Leipzig, 1797, p. 85. He was military surgeon, later professor of surgery, and died as such in Bern in 1837.

[2] "Ophthalmolog. Beobachtungen und Untersuchungen," Bremen, vol. i., p, 1.

[3] "De la Paralysie de l'Iris occasionée par Application locale de la Belladone, et de son Utilité dans le Traitement de divers Maladies des Yeux," par Himly. trad. par Emil August Ehlers, Paris, 1802.

[4] *London Med. and Phys. Journal*, 1801, vi., p. 352; cf. *Edinburgh Med. and Surg. Journal*, 1813, ix., p. 279.

[5] This book is wholly unobtainable in the book market. A brief abstract of it appeared in the *Pharmac. Handelsblatt*, 1885, p. 23.

to new researches. About this time I met Goethe, at the instigation of Döbereiner, who had told the poet that by experiments upon cats I had found a method of ascertaining with certainty whether or not a poisoning with stramonium had occurred. Goethe had thereupon expressed the desire to meet the young chemist, and to see the demonstration of his discovery. When I crossed the market square in the afternoon, dressed with a borrowed frock coat and stove-pipe hat, and carrying the cat under my arm, I created a universal sensation. The boys who were loitering about the place, at the cry 'Doctor Poison!' suddenly came towards me and surrounded me. To those joking at my fantastic appearance I said, 'Let me in peace. I am attending to some important business. I am going to Goethe.' I was instantly released. Coming to Goethe's house, I was led into the reception-room, and soon stood before the poet. His lofty, handsome, and powerful presence made such an overwhelming impression upon me, that, all in a tremble, I handed him the cat, as if I wanted thus to defend myself. 'Ah! So,' Goethe said, 'that's what is going to be the future terror of the poison-mixers. Just let me look.' I then turned the cat's head so that the light struck both eyes simultaneously, and the difference between the eyes could be readily seen. Goethe was greatly surprised. Alongside of the small slit in one eye, the round, great opening in the other presented a very striking difference. In consequence of a somewhat large dose, the entire iris had almost become invisible, thus enhancing this singular aspect. 'How did you obtain this effect?' asked Goethe. 'With hyoscyamus, your excellency,' I answered. 'I have placed the unmixed juice of the pounded herb in the eye, therefore the action is so strong.' 'Döbereiner told me,' said Goethe, 'that both belladonna and stramonium act alike, and that you have ascertained that the active toxic principle is contained in the plant in all of its parts, from the root to the blossom, fruit, and seed. How is it with other plants, especially those of an affiliated relation?' 'A friend of mine, Dr. Carl Heise, induced by the peculiar action of the stated plants, has shown in an elaborate work that only the plants of the three orders mentioned above affect the pupils in a mydriatic manner. He has tried the action of innumerable other plants on the eye, and found them all to be inert save a few which produced the reverse of mydriasis, viz., a contraction of the pupil, such as aconitum.' 'Well,' Goethe said, 'there is a chance to discover the proper antidote for the toxic action of belladonna. Try this, and apply both antago-

nistic plants either simultaneously or one after another to the eyes of a cat. Observe the result. The matter is not without difficulties, but you will overcome these. But now, pray tell me, how you came to this peculiar kind of organic chemistry?'" Runge related: "In 1810 I was—a pastor's son, from the country near Hamburg—sent to Lübeck, and placed in the Rathsapotheke as an apprentice. It was a warlike time, and Napoleon prepared his invasion of Russia. All men able to carry arms were mustered out, and, on account of the universal unwillingness to serve under the tyrant, it was a matter of difficulty to find a substitute. Through recommendation of my uncle, I had received admission into several aristocratic families, and the son of one of them became a friend of mine. One evening he came to the drug store in great commotion, and told me his trouble, that the day after to-morrow he had to present himself for service, and that, being without physical defect, he probably would be taken. 'I would like to mutilate my hand,' he sighed, 'in order not to go into this ignominious war.' 'That is not necessary,' I said. 'Confide in me. I believe to be able to mutilate you for a short time with impunity. They will have to exempt you from service.' 'What are you going to do with me?' 'I will make you blind for twenty-four hours.' 'How are you going to do that?' 'Listen to me. About eight weeks ago I had to prepare a medicine, according to a doctor's prescription, in which a decoction of the juice of hyoscyamus was to be dissolved in water. Preparing the medicine in a mortar, a drop accidentally got into my eye. I experienced no pain, and did not observe any alteration until sensations of light flashes caused me to go to the looking-glass. How great was my astonishment when I saw the change that had taken place in my eye. The iris had almost wholly disappeared, and the eye looked precisely like that of a man suffering from amaurosis. The power of vision was also greatly weakened, as I noticed when I closed the unaffected eye. I don't know why this state of things did not raise any fears in me. After lasting a few days, the abnormal condition disappeared, and the power of vision returned, and also the normal proportions of the iris, so that both pupils appeared again of equal size. And behold! such an affection I will produce in both your eyes, and it would be very queer if you would not be discharged even after a superficial examination.' After making some easily-removed objections, my friend consented to this, at that time, very pardonable fraud, and thus saved his life, for

of all men that went from Lübeck to the war in Russia but few returned. His temporary blindness lasted thirty-six hours, passed away painlessly, without leaving behind any deleterious results."

Thus far goes the report of Runge, from which we can distinctly see that he obtained the knowledge of the mydriatic action of the Solanaceæ by the same accident as Daries derived his knowledge. Runge is consequently the seventh discoverer of this action. He tried even to practically utilize his discovery at once; for he recommended in his dissertation ('De Novo Methodo Veneficium Dijudicandi,' Jenæ, 1819) in a case of suspected atropine intoxication to place a drop of the urine of the poisoned person into the eye of a cat. The word atropine does not seem to have been known to Runge, for the solanaceæ alkaloid, isolated approximately by him, he calls koromegyn (Greek, magnifier of pupil). This alkaloid was isolated in 1830 properly by the apothecary Mein,[1] of Neustadt-Göders, and independently of him in 1832 by Geiger and Hesse,[2] while Liebig,[3] determined its chemical formula. The solution of the pure sulphate of atropine, instead of the extract of belladonna, was at once used by Geiger[4] and Hesse for the purpose of dilating the pupil. The named chemists succeeded soon[5] after also in isolating hyoscyamine, the active principle of hyoscyamus. They showed that this alkaloid, like atropine, had a distinctly mydriatic action even in a dilution of 1 to 1000.

In the majority of books treating of these historical facts, such as in Hirsch's 'History of Ophthalmology,' and in Hirsch's 'Latest Discoveries of Materia Medica,' Heidelberg and Leipzig, 1843, vol. ii., p. 160, we find the statement that the complete isolation of atropine and hyoscyamine occurred in the first half of the second decade of this century, and was obtained by Brandes and Runge. This, however, is wholly untrue.[6] For all those cases referred only to purified extracts, but not to chemically pure alkaloids. After the mydriatic action of

[1] 'Liebig's Annalen,' vol. vi., p. 67.

[2] *Ibid.*, vol. v., p. 38.

[3] *Ibid.*, vol. vi., 1833, p. 66.

[4] *Ibid.*, p. 68.

[5] *Ibid.*, vol. vii., 1833, p. 271.

[6] Equally erroneous is the statement that Reisinger ('Bayerische Annalen;' Abhandlungen aus dem Gebiete der Chirurgie, Sulzbach, 1827; also *Salzburger Med. Chir. Zeitung*, 1825, No. 14, p. 237, and No. 15, p. 253) in 1824 had used the pure alkaloids of Solanaceæ.

the Solanaceæ alkaloids was positively made out, and had become generally known, their physiological *modus operandi* had to be determined.

Ernst Heinrich, as early as 1821, stated in his famous paper, *De Motor Iridis* (p. 102), that belladonna paralyzes the nerves of the muscular sphincter iridis. This view was confirmed by the experiments of Biffi (1845), Cramer and Ruiter (1853), and is now held exclusively by all ophthalmologists. Nevertheless, this view is only partially correct, for the most recent students of pharmacology have demonstrated that we have to deal here only with a paralysis of the peripheral ends of the nervus oculo-motorius, while the nervus sympathicus supplying the musculus dilator remains absolutely unaffected.

Fraser, of Edinburgh, discovered in 1861 the only practically applicable medium of pupillary contraction, viz., physostigmine or the extract of Calabar bean. Pilocarpine, muscarine, and nicotine likewise contract the pupil, but this contraction is in intensity and extent far inferior to that produced by physostigmine, and is of little practical importance.—*Therap. Gazette*, July, 1886.

ANTIFEBRIN, A NEW ANTIPYRETIC.

By A. Cahn and P. Hepp.

The body to which this name has been given is a well-known chemical material, acetanilid or phenylacetamide with the formula $C_6H_5NHC_2H_3O$. It is a pure white, crystalline, odorless powder, with a slight burning sensation on the tongue, is almost insoluble in cold but more readily in hot water, abundantly soluble in alcohol and alcoholic fluids. It melts at 113° C. and boils unchanged at 292° C. It has neither acid nor basic properties, and is very resistent to most reagents.

By experiments on dogs and rabbits the authors convinced themselves that even in relatively high doses it produces no poisonous effects. The temperature of normal animals is not affected by it.

The clinical observations were made on twenty-four patients with fever, as follows: typhoid fever 8, erysipelas 5, acute rheumatism 2, pulmonary phthisis 4, abscess of the lung 1, fever in leucæmia 1,

pyæmic fever in consequence of cystitis and decubitus 1, septicæmia 1, creeping pneumonia 1.

The drug was given in individual doses of ·25 to 1 gram, stirred up in water, or in wafers, or mixed with wine. The maximum dose hitherto given has been 2 grams in 24 hours. The appropriate dose varies with the nature of the illness; but the authors lay down the rule that the dose required to produce the equivalent effect is about one quarter the corresponding dose of antipyrine. They also find that distinct apyrexia is easier attained by single large doses than by repeated smaller ones. They then give some examples of the action of antifebrin.

From these it is seen that its action is already marked at the end of one hour, reaches its maximum after about four hours, and is over in from three to ten hours, according to the dose given. The temperature is lowered for six to eight hours by a dose which can reduce high temperature to the normal or under. A reduction of the temperature to the normal was accompanied by reddening of the skin and a fair amount of sweating. Its re-ascent was not accompanied by shivering, though in some cases, as with antipyrin, the patients had a sensation of cold. The fall in temperature is accompanied by a considerable diminution in the pulse rate, and by an increase in tension. The digestive tract tolerates antifebrin well, there being neither vomiting or nausea, nor diarrhœa. In some instances, during the afebrile period, along with a quite unusual thirst a marked increaee of diuresis occurred. None of the patients had any complaint to make of the medicine. The only symptom which caused any anxiety was a notable cyanosis in the face and extremities of some of the patients, which set in with apyrexia, and reached different degrees, but disappeared without any unpleasant effect, so that the observers ceased to trouble about it. In some instances the patients went off into a quiet sleep during the afebrile period.

The recommendations of this antipyretic are, then, its efficiency in comparatively small doses, the absence of troublesome symptoms on the part of the stomach, the slight amount of transpiration, and lastly its cheapness. It may be obtained from Kalle & Co., purified, at 30 marks per kilogram. Experimenters are advised as to the necessity of using the purified material.

The authors, in conclusion, call attention to this being the first indifferent body which has been found to possess antipyretic properties,

previously discovered antipyretics being either phenols (carbolic acid, hydrochinon, resorcin, salicylic acid), or bases belonging to the chinolin series (chinoline, kairine, antipyrine, thalline, quinine).—*Med. Chronicle*, Sept.—*Centralbl. f. klin. Med.*, Aug. 14, 1886.

JABORINE.

By Hardy and Calmels.

Pure dry pilocarpine does not yield jaborine when heated at 100° for six hours, neither can this substance be obtained by the action of alcoholic iodides on argento-pilocarpidine. If, however, carefully dried pilocarpine is heated rapidly to 175°, kept at this temperature for about half an hour, and the product extracted with water made alkaline with baryta, and shaken with ether, the ether contains jaborine, and the aqueous solution contains pilocarpidine and jaboric acid. *Jaborine* separates from alcohol or ether in a brown mass, which changes to a brittle, resinous solid. It is insoluble in water, but dissolves readily in ether, and is also soluble in jaboric acid. From solutions of the hydrochloride it is thrown down by potash as a curdy precipitate, which readily agglomerates under warm water. When boiled with concentrated aqueous potash it is converted into pilocarpidine.

Jaborine hydrochloride is extremely soluble in water and alcohol. When boiled with excess of hydrochloric acid, it is converted into pilocarpidine hydrochloride. Solutions of jaborine are brown with a greenish fluorescence, which is not completely removed by animal charcoal. An alcoholic solution of free jaborine yields with a limited quantity of platinic chloride, a dirty-white, gelatinous precipitate of the composition $(C_{22}O_{32}N_4O_4)_2,PtCl_4$; with platinic chloride in excess, a yellowish-white precipitate of the composition $C_{22}H_{32}N_4O_4,PtCl_4$, and with auric chloride a precipitate of the composition $C_{22}H_{32}N_4O_4,2AuCl_3$. In presence of a slight excess of hydrochloric acid, platinic chloride, whether in excess or otherwise, precipitates the compound

$$C_{22}H_{32}N_4O_4,H_2PtCl_6.$$

Jaboric acid is separated from pilocarpidine by precipitating with excess of silver nitrate, which forms a curdy precipitate of the composition $C_{19}H_{24}N_3O_5Ag,AgNO_3$. Jaboric acid resembles jaborine in appearance, but is very soluble in water, and is not removed from its

aqueous solution by ether. With alkalis it forms gummy salts, which dissolve in water and alcohol, and are not decomposed by carbonic anhydride. With silver nitrate in limited quantity it forms the compound $C_{19}H_{24}N_3O_5Ag$, which is precipitated by alcohol in the form of a brown powder. Hot concentrated potash or boiling hydrochloric acid converts jaboric acid into pilocarpidine and β-pyridine-α-lactic acid. Alcoholic solutions of jaboric acid give with platinic chloride in limited quantity a viscous precipitate of the compound

$$(C_{19}H_{25}N_3O_5)_2,PtCl_4;$$

with platinic chloride in excess, a yellow precipitate of a hemiplatinochloride, $(C_{19}H_{25}N_3O_5)_2,PtCl_4 + 2C_{19}H_{25}N_3O_5,PtCl_4$. With auric chloride a diaurochloride, $C_{19}H_{25}N_3O_5,2AuCl_3$, is formed. The hydrochloride and nitrate of jaboric acid are viscous substances; an aqueous solution of the former gives a viscous precipitate of the composition $(C_{19}H_{25}N_3O_5)_2,H_2PtCl_6$, with a limited quantity of platinic chloride.

Jaborine and jaboric acid are products of the condensation of pilocarpine, this condensation taking place on the betaine nucleus, and may be thus represented (Py = pyridyl):—

$$NMe_3{<}\begin{matrix}CMePy\beta\cdot CO\cdot O\\ O\cdot CO\cdot CMePy\beta\end{matrix}{>}NMe_3.$$

Jaborine.

$$OH\cdot CMePy\beta\cdot CO\cdot O\cdot NMe_3\cdot CMePy\beta\cdot COOH.$$

Jaboric acid.

C. H. B.

—*Jour. Chem. Soc.*, September, 1886, p. 815; *Compt. rend*, cii.

PEPTONES.

By W. Kühne and R. H. Chittenden.

Ammonium sulphate precipitates from a solution all proteïds but peptones. Peptones can in this way be obtained free from albumoses, with which they have in previous researches always been mixed. It was therefore necessary to repeat many previous experiments concerning the composition and properties of peptones. Amphopeptone, the mixture of peptones obtained in gastric digestion, and antipeptone, from tryptic digestion, were thus examined. The result of digestion was acidified with acetic acid, saturated with ammonium sulphate, filtered, the filtrate evaporated to small bulk, and filtered from the crystals of the salt which separated; the

remainder of the salt was removed by aqueous baryta, and the last traces by barium carbonate; dilute sulphuric acid was added to remove the baryta, and the barium sulphate filtered off. From the filtrate the peptones were precipitated by alcohol, redissolved, and again precipitated by phosphotungstic acid, and dried. In the case of amphopeptone, the first analyses were invalidated by adherent pepsin, and a substance designated mucin-peptone, apparently derived from the mucous membrane of the stomach; it forms a sticky, elastic precipitate with alcohol, but was not further investigated. The error due to these admixtures was obviated by saturating concentrated artificial gastric juice with ammonium sulphate; this precipitates the mucin and pepsin; pepsin alone redissolves in dilute hydrochloric acid; this solution was used as a digestive fluid; from it no mucin-peptone was obtained. The remains of the pepsin were subsequently removed by the ammonium sulphate with the albumoses.

Antipeptone was prepared both from fibrin and by the pancreas being allowed to digest itself.

The following table gives some of the results obtained in the analyses of these substances. In each case the samples had been purified by means of phosphotungstic acid. I. Amphopeptone from fibrin; II. Antipeptone from fibrin; III. Antipeptone from the pancreas:—

	C.	H.	N.	S.	O.	Ash.
I.....	48·75	7·21	16·26	0·77	27·01	3·22
II.....	46·59	6·69	18·28	0.67	27·77	3·67
III.....	44·47	7·15	17·94	0·57	29·87	2·07

Contrasted with previous analyses, the numbers obtained show about 1 per cent. less carbon, 1 per cent. more nitrogen, and 0·3 to 0·4 per cent. less sulphur. The percentage of nitrogen is greater in antipeptone, especially in that obtained from the gland, than in amphopeptone.

The following are the chief properties of pure peptone: When dissolved in water, it hisses and froths in the same way that phosphoric anhydride does; heat is at the same time evolved. Its solution in water is brown, which prevents its lævorotary power from being estimated. Its taste is somewhat cheesy, but not unpleasant. The bitter taste of artificially digested food must therefore be due to some product not yet separated, native proteïds and albumoses being almost tasteless. Peptones are not precipitated by sodium chloride in acid

solutions, nor by ammonium sulphate; they are completely precipitated by tannin, potassio-mercuric iodide, phosphomolybdic acid, phosphotungstic acid, and picric acid. A 5 per cent. solution rendered faintly alkaline by soda has the following additional properties:—

Reagent.	Fibrin-antipeptone.	Fibrin-amphopeptone.
Acetic acid and ferrocyanide of potassium.	At first clear; later a trace of opalescence.	
Normal lead acetate.....	First drop nothing; more, well-marked opalescence.	Opalescence less marked.
Basic lead acetate	Dense opalescence.	Opalescence less dense.
Mercuric chloride.....	First drop nothing; more, dense opalescence.	Opalescence denser.
Copper sulphate (5 per cent).	At first clear; later, a feeble opalescence, disappearing with excess of reagent.	Nothing.
Platinic chloride (5 per cent).	Feeble opalescence with excess.	Nothing.
Chromic acid.....	Nothing.	Nothing.
Ferric chloride.....	Opalescence disappearing on small excess.	Nothing.
Ferric acetate and concentrated H_2SO_4.	Brown-red color.	Brown-red color.
Nitric acid.....	Yellow color.	Yellow color.
Boiling with concentrated HCl.	Color darkens a little.	Color darkens a little.
Millon's reagent.....	A white precipitate turning to a dirty yellow on heating.	A white precipitate turning to bright red on heating.
Buiret reaction.....	Well marked.	Well marked.

The most noteworthy difference in the above table is the behavior to Millon's reagent; antipeptone never forms leucine and tyrosine in pancreatic digestion, whilst amphopeptone, which contains hemipeptone, does; antipeptone, moreover, after being subjected to the action of trypsin, yields no products which are colored red or violet by bromine or chlorine water, as hemipeptone does. Moreover, when treated with sulphuric acid, antipeptone did not yield crystals of tyrosine; and no proof could be obtained of its presence by Hoffmann's nor by Piria's reaction. From antialbumid, similarly, no tyrosine could be obtained; whether this will prove to be a general

rule for the anti-group of digestion-products the authors intend to investigate.—*Jour. Chem. Soc.*, September, 1886, p. 819; *Zeitsch. Biol.*, xxii. 423.

INFLUENCE OF GLYCEROL, SUGAR, AND FAT ON THE SECRETION OF URIC ACID IN MAN.

By J. Horbaczewski and F. Kanera.

A series of experiments were conducted on one of the authors during a period of seventy days, when the daily rations and mode of living were the same, with the exception of periods during which varying daily amounts of glycerol, sugar, and fat respectively were taken in addition to the normal food. For full details of the quality and quantity of food consumed and detailed analyses of the excreta the original paper must be consulted. The general results were:—

When glycerol is taken with the daily food a marked increase in the amount of uric acid secreted takes place; this, however, is only the case when free glycerol is taken; if it is taken combined with the fatty acids as neutral fats, it exerts no influence on the formation of uric acid.

Cane-sugar, and probably other carbohydrates, exert no direct influence on the formation of uric acid; it causes, however, a marked decrease of the secreted uric acid, due to the "albumin-retarding" action of the carbohydrates and proportional to it. This lowered secretion only continues as long as cane-sugar is taken. With the stoppage of the sugar, the normal uric acid formation does not again take place, but the entire amount of acid which was not secreted in consequence of the sugar is first passed, and then the normal quantity begins.

The neutral fats have a similar influence on the formation of uric acid to that of carbohydrates, but the after effects are different. The decrease in the amount of acid is proportioned to the "albumin-retarding" action of the fat, but when the addition of fat to the diet is stopped, the secretion of uric acid returns at once to the normal amount.

Glycerol causes an increase in the amount of albumin formed in man, as it was known to do in the dog.

The authors consider that their results have an important bearing

on the question of suitable diet for persons suffering from certain diseases which cause too large a secretion of uric acid.—*Jour. Chem. Soc.*, September 1886; *Monatsh. Chem.*, vii., 105.

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

A stated meeting of the members of the Philadelphia College of Pharmacy was held September 27th, 1886, at 3.30 p. m. in the hall, Charles Bullock presiding; twenty-three members being present. The minute of the previous meeting was, as usual, read and adopted. The proceedings of the Board of Trustees at the September meeting, as also those of a special meeting of the Board to take action on the death of Dillwyn Parrish, were presented, and on motion approved.

The report of delegates to the American Pharmaceutical Association, held at Providence in September, was offered by the Chairman, Mr. Alonzo Robbins, and accepted. The following summary of that report presents subjects of interest. The committee appointed to consider suggestions embraced in the address of the President of the Association recommended, 1st.—"That the Association seek the aid of the American Medical Association for the purpose of inducing an adherence, in prescribing, to officinal medicines only, and that the various State Associations use similar effort to secure the same object with their respective State Medical bodies." 2d.—"That there be a revision of existing methods in the management of the Association with a view to securing improvement." 3rd.—"That the influence of the Association should be used to prevent further multiplication of colleges of pharmacy." Among the items of general business, the following may be noted. The report of the committee on unofficinal formulæ was ordered to be printed. A resolution on this subject was, however, offered by Mr. J. H. Redsecker, of Lebanon, Pa., to the effect that in addition to the present committee of five members from New York and Brooklyn there shall be one member appointed from each State Pharmaceutical Association, all of whom shall, together, constitute the future committee. Mr. Charles A. Tufts, of Dover, N. H., the Treasurer of the Association for many consecutive years, was elected to the Presidency for the term ensuing. Cincinnati, Ohio, and the first Monday in September of 1877, indicate the place and time for the next meeting.

The report of the committee on deceased members was made by Mr. Bullock and prefaced by some suitable remarks. The report consisted, in chief, of a memoir of the late Peter Williamson, which was by motion received and assigned to the committee on publication. Mr. Bullock read a letter from an honored member, Samuel F. Troth, addressed to his fellow-members of the College, having reference to the death of Dillwyn Parrish. At the suggestion of the President, the Secretary was directed to indite a reply to the letter of Mr. Troth. In this connection, a historical note of those associated with the origin and early history of the College was submitted and directed to be placed upon the minutes.

The chairman made allusion to the inauguration and operation of the work of the Committee on Apprentice Examination, and requested Mr. Wallace Procter to give a verbal resume of the result as far as attained. In response Mr. Procter gave a brief statement of the purpose and scope of this examination, and stated that the idea appeared to meet with pronounced approbation and encouragement, the committee believing that as the object becomes better understood it will grow into favor, not only with proprietors and preceptors, but with students and novitiates as well. The examination as instituted amounts practically to individual self-inquiry into that condition of educational attainment which especially fits the pharmacist for future study and practice. There were four successful candidates at the first examination, each of whom received the attest of the committee in a certificate.

The chairman informed the members of the sanction given by the Board of Trustees to Dr. John J. Reese to institute, under certain conditions, an auxiliary course of lectures on Toxicology.

On motion to go into an election of candidates for membership in the college, the name of Thos. H. Franklin, whose application had been favorably reported, was presented. To conduct the balloting, Mr. Gustavus Pile was appointed. Mr. Pile subsequently reported the unanimous election of Mr. Franklin.

The terms of four trustees (one terminating by death), as well as the term of the Committee on Deceased Members, expiring with this date, an election was ordered. Messrs. Ferguson and Ross were appointed to act as tellers, and nominations were called for. The tellers formally reported the election of the following gentlemen: As Trustees for three years, Alonzo Robbins, E. M. Boring, Howard B. French; as Trustee for the unexpired term of W. C. Bakes, deceased, Dr. Charles A. Weidemann; as Committee on Deceased Members, Chas. Bullock, Gustavus Pile, Wallace Procter.

Prof Maisch announced the death of a corresponding member of the College, Niccola Cavour Sinimberghi, a distinguished pharmacist of Rome, Italy.

Announcement was also made of the inauguration of the lecture courses of 1886–1887, with introductory by Professor Sadtler.

No other business being presented, a motion to adjourn prevailed.

WILLIAM B. THOMPSON, *Secretary.*

Thalline.—Mr. Mayrhofer, during an epidemic of enteric fever occurring in a Bavarian regiment, employed thalline in three different forms, namely, the sulphate, the tannate and the tartrate, and obtained highly satisfactory results from them all. He gave the drug according to Ehrlich's continuous system, the doses being generally 0 2 gram, repeated when the temperature rose. From 1·0 to 2·0 grams were given per diem. The total quantity required varied from 8 grams in mild cases to 26 grams in severe cases with relapses. After taking the medicine, a profuse perspiration occurred, which invariably appeared to improve the patient's condition. No unpleasant effects were ever observed. There were altogether eighty-eight cases, of which three (that is, 3·4 per cent.) died. It was not possible to say that one of the three preparations presented any marked differences in its action from the other two.—*Med. and Surg. Reporter*, Aug. 7, 1886.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 19th, 1886.

Pursuant to notice the first of the series of pharmaceutical meetings was held this day; on motion of Professor Maisch, Mr. Wm. B. Webb was called to preside.

The reading of the minutes of the last meeting was, on motion, dispensed with.

The following works were reported as having been received since the last meeting: Vol. VII. of the Index of the library of the Surgeon-General's office from the Surgeon-General, U. S. A., and a copy of part II. of the Report of the Smithsonian Institution for the year 1884 from the Secretary of the Institution. A number of volumes of the Proceedings of the American Pharmaceutical Association, with fifteen bound volumes of the American Journal of Pharmacy, were presented by Mr. Andrew Blair. Four volumes of Cours Élémentaire de Chimie by Regnault; one volume Mineral Resources of the United States; one volume Barnard Proctor's Lectures on Pharmacy; a copy of Hare's Chemical Philosophy, and one of Hare's Chemistry, from the Actuary. A vote of thanks of the College was offered to the givers of the various works.

Mr. J. W. England read a paper upon *Solution of Magnesium Bromide*, which was referred to the Publication Committee. Mr. McIntyre thought it was a matter of gratulation that one of our General Hospitals should be willing to diffuse information about what is going on in their wards.

Professor Maisch alluded to the *squill* bulb which was exhibited to the pharmaceutical meeting last year; the bulb was presented to the College by Mr. G. I. McKelway, and while it was destitute of leaves, the flower stalk shot up and in three and a half weeks it attained a height of six and three-quarter feet, the raceme alone being twenty-seven inches in length. The allusion to the squill elicited a conversation upon its poisonous properties, and it was stated that although quite a number of papers have been written upon the subject, the active principles had not been fully isolated. Merck has described several principles, but has not published the process for preparing scillipicrin, scillitoxin and scillin. The physiological action of these principles has not been definitely settled.

Professor Maisch exhibited specimens of *benzoin* of remarkably fine quality, which was recovered about a year ago from the wreck of a Dutch East Indian Company's vessel lost in Table Bay about the year 1691. The cargo had remained there undisturbed till a party obtained license to raise whatever they could of the cargo. Among the goods recovered were some cases of benzoin which, on being offered to London dealers, was at first looked upon with suspicion, as its appearance was so different from that usually seen in commerce. Examination proving it to contain fully ninety-two per cent. of matter soluble in alcohol, and to be quite superior in regard to its benzoic acid strength, it was readily disposed of. Several of the cases were well preserved, with the marks and numbers plainly visible, giving the name of the drug, the net weight and the year 1691. The sample had been obtained from Mr. William Saunders, London, Canada.

Professor Remington introduced Mr. Michaels, of Brooklyn, N. Y., to the meeting, and he exhibited an apparatus for the accurate *division of powders* for prescription work. It consists of a hollow brass cone pierced at its apex, through which a solid rod passes, and has a bayonet joint by which it may be tightly fastened to the rod. A tube, accurately fitting into the cone, and provided with projecting blades corresponding to the number of powders to be made, is used for dividing. The base of the cone has a cover which fits tightly to it and on it a movable triangular plate is secured. When the apparatus is in use the powder is filled into the inverted cone; the tube armed with the blades is pushed into place on the central axis; the lid is put on the base of the cone and the whole apparatus is then inverted, thus throwing the divided powders upon the lid, each powder remaining in a partition formed by the projecting blades. The little movable triangular plate is turned to one side over the cover when the contents of one division is thrown out on the paper. This is repeated by partially rotating the cover till all the spaces have been emptied; by emptying the contents of two or more partitions upon one paper, it will be seen that a machine capable of giving twelve powders may be utilized for six, four or three powders as may be desired.

The exhibition of this apparatus gave rise to considerable discussion relative to the rapidity with which powders can be accurately dispensed in prescriptions.

There being no further business a motion to adjourn was carried.

T. S. Wiegand, *Actuary.*

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Twenty-second Annual Report of the Alumni Association; with the exercises of the sixty-fifth commencement of the Philadelphia College of Pharmacy, for the year 1885-6. 8vo, pp. 204.

As usual, this report gives the proceedings at the various social meetings and the annual meeting of the Alumni Association, together with the addresses and lectures delivered on these occasions, and at the beginning of the annual course, and at the commencement of the College; with much other information of particular interest to the graduates and students of this institution. The volume may be obtained from the secretary, Wm. E. Krewson, Ph.G.

The Proceedings of the following State Pharmaceutical Associations have been received:

Georgia. 8vo, pp. 40. See June number, p. 317.

Louisiana. 8vo, pp. 54. See June number, p. 318.

Pennsylvania. 8vo, pp. 250. Appended and paged separately is the report of the Committee on Unofficinal Formulæ, pp. 54. A report of the meeting was published in our July number, p. 361.

Third Biennial Report of the Commissioners of Pharmacy for the State of Iowa; with regulations and abstract of State Pharmacy Register. August 15, 1885. 8vo, pp. 136.

Official Circulars of the Commission of Pharmacy of Iowa. Issued April 8 and May 28, 1886.

Fifth Annual Report of the Illinois Board of Pharmacy; with abstract of State Pharmacy Register. 8vo, pp. 184.

Sixth Annual Report of the State Board of Health, Lunacy and Charity, of Massachusetts. Supplement containing the report and papers on Public Health. Boston: 1886. 8vo, pp. 357.

This volume contains also the General Index to the Health Supplements, issued since 1879.

Commonwealth of Pennsylvania, State Board of Health. We acknowledge the receipt of a number of documents from the secretary, Benj. Lee, M.D., 1532 Pine street, Philadelphia. Among them: Report of Organization; Rules of the Board; Provisional Regulations relating to Slaughter Houses, etc.; Precautions against Cholera and against Small-pox; Model Ordinance for the Better Preservation of the Public Health in Cities and Boroughs, etc.

Report for the Year 1885–6, *Presented by the Board of Managers of the Observatory to the President and Fellows of Yale College.* 8vo, pp. 15.

Methods of Analysis of Commercial Fertilizers. Proceedings of the third annual convention of the Association of Official Agricultural Chemists, August 26 and 27, 1886. 8vo, pp. 59.

Issued by the Department of Agriculture, Division of Chemistry, as Bulletin No. 12.

The following reprints from medical journals have been received:

Impetigo Contagiosa. By E. J. Beall, M.D., Fort Worth, Tex. From *Texas Med. Jour.*, August.

Some Recent Experiences in Clinical Surgery. By Donald Maclean, M.D., Detroit. From Transactions Mich. State Med. Soc. for 1886.

Galvano cautery in Diseases of the Prostate, Bladder and Urethra. By Rob. Newman, M.D., New York. From *Jour. Amer. Med. Assoc.*, August 28.

Is Electrolysis a Failure in the Treatment of Urethral Strictures? By Rob. Newman, M.D., New York. From *The Med. Record*, Sept. 25.

THE AMERICAN
JOURNAL OF PHARMACY.

DECEMBER, 1886.

LIQUOR HYDRARGYRI NITRATIS.

By Frank X. Moerk, Ph.G.

Read at the Pharmaceutical Meeting November 16th.

This officinal solution is defined as "a liquid containing in solution about 50 per cent. of mercuric nitrate [$Hg(NO_3)_2$; 327·7—HgO. NO_5; 161 85] with some free nitric acid."

Shortly after the appearance of the Pharmacopœia in 1882, in calculating the molecular weights of the officinal mercury compounds, I found that the molecular weight of mercuric nitrate as given in the above definition is incorrect. According to the table of atomic weights in the U.S.P. it is 323·7; the atomic weight of mercury being 199·7, nitrogen 14, and oxygen 16.

Recently, in making the calculation to prove that the parts used in the preparation of this solution yielded the amount of product as given in the definition, it was discovered that here there was another error. The formula is:

Red oxide of mercury,	40	parts.
Nitric acid,	45	"
Distilled water,	15	" to make 100 parts.

If the reaction which takes place be first written and then the molecular weights substituted for the formula, we have:

$$HgO + 2HNO_3 = Hg(NO_3)_2 + H_2O.$$
$$215{\cdot}7 \quad 126 \quad 323{\cdot}7 \quad 18.$$

These figures tell us that, the materials being pure, from every 215·7 parts HgO we can obtain 323·7 parts $Hg(NO_3)_2$. Now in calculating the amount of $HgO(NO_3)_2$ which can be obtained from 40 parts HgO, we have the proportion:

$$215{\cdot}7 : 323{\cdot}7 :: 40 : X \quad X = 60 \text{ parts.}$$

These 60 parts of $Hg(NO_3)_2$ being present in 100 parts of the solution show that the solution contains 60 per cent. and not 50 per cent., as stated in the definition.

Two explanations for this error may be given:

1st. It was the intention to form a 60 per cent. solution and thus the error confined to a misprint in the definition, or

2nd. A mistake was made in the calculation and a 60 per cent. solution gotten, the properties of which were ascribed to a 50 per cent. solution.

The specific gravity is the only test given to indicate the strength of the solution. This is stated to be 2·100. A commercial solution of nitrate of mercury was found to agree with the product as furnished by the U.S.P. formula. The specific gravity of the sample was found to be 2·065 at 16°C.

To find the percentage of mercuric nitrate, the mercury was estimated by taking 1·007 gm. of the solution, diluting with water, precipitating with hydrogen sulphide, collecting on a weighed filter, drying at 100°C. and weighing as mercuric sulphide. Weight 0·429 gm.

The reaction in the precipitation is:

$$Hg(NO_3)_2 + H_2S = HgS + 2HNO_3.$$
$$323{\cdot}7 \qquad 34 \qquad 231.7 \qquad 126.$$

From this can be calculated the weight of $Hg(NO_3)_2$ which yielded 0·429 gm. HgS.

$$231{\cdot}7 : 323{\cdot}7 :: 0{\cdot}429 : X \quad X = 0{\cdot}5993 \text{ gm. } Hg(NO_3)_2.$$

This quantity being present in 1·007 gm. solution, the percentage is gotten by the proportion:

$$1{\cdot}007 : 0{\cdot}5993 :: 100 : X \quad X = 59{\cdot}51 \text{ per cent.}$$

Showing that the commercial solution contains approximately 60 per cent. mercuric nitrate.

A 50 per cent. solution was made by substituting 33·32 parts HgO for the pharmacopœial quantity, 40 parts. This figure was obtained as follows: If 323·7 parts $Hg(NO_3)_2$ are formed from 215·7 parts HgO, then 50 parts $Hg(NO_3)_2$ are formed from 33·32 parts HgO.

The formula is:

Red oxide of mercury,	33·32	parts.	
Nitric acid,	45	"	
Distilled water,	21·68	"	to make 100 parts.

The specific gravity of this solution is 1·885 at 17°C. decidedly less than that given in the U.S.P., although there is a larger percentage of free nitric acid present.

The percentage of mercuric nitrate was estimated as under the commercial sample. 1.075 gm. of the solution yielded a precipitate of mercuric sulphide, weighing 0·385 gm. By analogous proportions it was first found that this quantity of HgS resulted from 0·5378 gm. $Hg(NO_3)_2$, and that this corresponded to 50·03 per cent. $Hg(NO_3)_2$ in the solution.

It may be of interest to state that of the 45 parts nitric acid used in the Pharmacopœia, only 33·66 are required to form mercuric nitrate from the mercuric oxide, an excess of 11·34 parts, or 25 per cent of the quantity used, being present in the solution.

In the formula for making a 50 per cent. solution of mercuric nitrate, there is needed to form mercuric nitrate from the 33.32 parts HgO, 28·04 parts nitric acid, therefore there is an excess of 16·96 parts, or 37·69 per cent of the quantity used in the solution.

If the solution of nitrate of mercury should contain an excess of 25 per cent of the nitric acid used, then will be required for a 50 per cent. solution of mercuric nitrate:

Red oxide of mercury,	33·32	parts.	
Nitric acid,	37·38	"	
Distilled water,	29·30	"	to make 100 parts.

A STUDY OF THE USE OF MAYER'S REAGENT IN THE ESTIMATION OF ALKALOIDS.

By A. B. Lyons, M. D.*

The assumption that underlies the method of volumetric estimation of alkaloids by Mayer's reagent is, that the precipitate produced by it is a definite chemical compound of invariable composition, so completely insoluble in water that no appreciable quantity of the alkaloid can remain in solution in presence of an excess of the reagent. Conditions such as these obtain in the case of many reactions between inorganic salts, and under such conditions alone can volumetric estimations give us satisfactory and constant results. I have instituted a series of experiments to ascertain to what extent the precipitation of alkaloids by Mayer's reagent conforms to these conditions.

In a paper published some twenty years ago † Thomas B. Groves pointed out the circumstance that in titrations with Mayer's solution a point would be reached before precipitation ceased when the filtered fluid would cause a precipitate in a fresh solution of the alkaloid, showing the presence already of an excess of the precipitant. Mr. Groves observed that in some instances this apparent excess after a

* Read before the Michigan State Pharmaceutical Association, October, 1886.

† *Pharm. Journal* II., 6, 268.

time disappeared, showing that the reaction is not instantaneously completed, or possibly that an intermediate soluble compound is first formed, which subsequently takes up a larger proportion of the alkaloid, frequently producing in this manner distinctly crystallized compounds.

My own observations, made at first in ignorance of Mr. Groves' paper, are confirmatory of the earlier ones. I found that in the case of some of the alkaloids, the solution would begin to show apparent excess of reagent when scarcely half the quantity had been added necessary for complete precipitation. The larger the quantity of fluid present, the larger the amount of this excess, which, it seems, must form a definite proportion of the entire fluid.

The practical deduction from this observed fact is, that the titration equivalent of any given alkaloid varies with the degree of dilution of the solution. If it is fixed, *e. g.*, for a solution of 1 : 200, a correction must be made in titrating more dilute solutions, *not additive, as most writers represent, but subtractive.*

The experiments, whose results are given in the following tabulated statement, aimed to gather data on which to base formulæ for correcting the results of titrations, and further, to study the influence of other variations in the conditions, such as the presence in the solution of alcohol, glycerin, etc. In all the experiments the Mayer's reagent used was 1–20 normal, *i. e.*, one-half the strength of the original Mayer's solution. Two modified forms of the reagent were prepared, No. 1 containing 5 molecules instead of 3 of potassium iodide, No. 2 containing barely enough potassium iodide to hold in solution the mercuric iodide. The quantity of mercury in all was the same, and in each experiment 0·10 gram of alkaloid was used.

In each experiment reagent was added gradually until a drop of the filtered fluid began to give a faint cloud with a fresh portion of the alkaloidal solution. The quantity of reagent required is set down in column 3 of the table. In some cases this point was passed before any reading of the burette was taken; such reading was then entered in column 4. When the precipitation was nearly complete, so that the addition of a drop or two of reagent produced only a faint cloud, another reading of the burette was frequently taken, entered in column 5. The table otherwise is self-explanatory. When not otherwise stated, the titrations were made in presence of a little free sulphuric acid—about 1 minim of 6 per cent. acid to each cc. of fluid titrated.

Name of alkaloid. 0.100 used in each experiment.	Especial conditions.	Proportion of alkaloid in solution titrated.	Mayer's Solution, 1-20 Normal.					
			Required to give apparent excess.	Added, giving large excess.	Produces only slight precipit.	Required for complete precipitation.	Excess at end of titration.	Actually consumed
Aconitine (Merck's cryst.)		1:200			6·2	7·3†	2·2	5·1
Aconitine, crude from Aconite root		1:200	3·3		6·0	6·25		
" "		1:400	3·5		5·9	6·3		
Atropine		1:200		8·		13·1	3·0	10·1
"		1:200		7·1		14·9††	4·3	10·9
"		1:200		7·0		13·6	4·0	9·6
"		1:400	5·2			14 0†	3·5	10·5
"		1:600		7·6		15·0	5·6	9·4
"	Modified reagent No 1	1:200	5·5			11·2	2·8	8·4
"	" " "	1:400		8·		11·6	3·2	8·4
"	" " "	1:600		7·2		10·8	2·6	8·2
"	Modified reagent No. 2	1:400				12·9†		
Berberine		1:200				3·7	0·2	3·5
"		1:400				3·8		
"		1:600				4·2 to 4·6		
"	Modified reagent No. 1	1:200				3·8		
"	" " "	1:4 0				3·8		
"	Modified reagent No. 2	1:400				6·0 to 7·2		
Brucine (Commercial)	Sol. slightly acid	1:200			7·6	8·0†	1·7	6·3
"	Sol. nearly neutral.	1:200	5·1		6·4	6·9	0·9	6·0
"	" " "	1:400		6·8	8·4	8·8		
Brucine (Commercial)	Sol. quite neutral	1:400	6·0		7·6	8· to 9·2†		
"	Sol moderately acid	1·400			8·0	9· to 9 8†		
"	Sol. nearly neutral.	1:600	6·0			9·2†		
"	Mod. reagt. No. 1.	1:200		4·8		6·	1·3	5·7
"	" " "	1:400		6·	7·2	7·6		
"	KI, 0.8 added.	1:400		4·8		6·8		
"	" " " †	1:400			5 2	5·6		
"	25 per cent. alcohol present †	1:400		5·8	8·	9· to 10·†		
"	" " "	1:400		6·4	10·	11·2†		
Brucine (Merck's pure)	Sol. faintly acid	1·400			9·6	10 0		
"	Sol. neutral	1:400			11·6	? †		
"	" " 25 per cent. alcohol present.	1:400			12·0	13·2†		
"	Sol. acid, 25 per cent. alcohol present	1:400			11·2	11 6†		
Cinchonidine		1:100	12·4			13·8	1·0	12·8
"		1:200	11·2			15·6	2·6	13·0
"		1:200				13·5	0·7	12·8
"	Mod. reagent No. 1	1:200				12·3*		
Cinchonine	Sol. quite neutral	1:200	7·9			10 8		
"	Sol. quite acid	1:200		12·8		14 2		

Name of alkaloid. 0.100 used in each experiment.	Especial conditions.	Proportion of alkaloid in solution titrated.	Mayer's solution, 1-20 normal.					
			Required to give apparent excess.	Added, giving large excess.	Produces only slight precipit.	Required for complete precipitation.	Excess at end of titration.	Actually consumed
Cinchonine	Sol. strongly acid.	1:200	12·0		17·4	19·4†		
"	Sol. neutral	1:400	8·0			12·4	2·4	10·0
"	Sol. acid	1:400	10·0			14·0		
"	Sol. strongly acid	1:400	11·5			14·0*		
"	Mod. reagent No. 1	1:200	7·0			8·4		
"	" "	1:400	7·1			9·4	0·8	8·6
"	" " sol. acid	1:400	8·8		12·4*	16·0††	3·6	12·4
"	Mod. reagent No. 1, 25 per cent. alcohol	1:400	6·2			11·6		
Cocaine		1:25				9·0		
"	Sol. neutral	1:200	7·2			9·7	0·7	9·0
"	Sol. acid	1:200				10·6	1·1	9·5
"	" "	1:200				12·1*		
"	" "	1:300			12·4	13·2*		
"	" "	1:400	10·0		12·8	14·4	4·6	9·8
"	Sol. nearly neutral	1:400				15·2		
"		1:600		14·0		16·0†	5·2	10·8
"		1:600			14·8	15·2		
"	Mod. reagent No. 1	1:200	8·		9·2	9·6		
"	" " "	1:200				11·2	1·8	9·4
"	" " "	1:400		11·2	12·0	14·4	4·1	10·3
"	2 per cent. KI present	1:200			9·2	11·3†		
"	8 per cent. KI present	1:300			9·6	11·2†		
"	3 per cent. KI present	1:600			12·8	14·4		
"	4 per cent KI present	1:600			11·6	13·2		
"	5 per cent. KI present	1:600			10·8	12·8		
"	Mod. reagent No. 2	1:200				12·2	1·6	10·6
"	20 per cent. alcohol present	1:400				14·5		
"	20 per cent. glycerin present	1:400				13·4		
Colchicine (Merck's)		1:300			9·2	10·1 to 11·0†		
"	Mod. reagent No 1	1:400	2·5		8·0	9·2†		
Colchicine Crude from colchicum seed)		1:200	3·2			9·2		
"		1:300	4·0		9·0	10·2		
"		1:400		6·	9·6	10· to 12·†		
"		1:600		5·	8·6	11·5to12·5†		
"		1:800	4·0		12·6	14· to 15·†		
Emetine		1:200	8·0		8·8	9·2 to 9·8		8·8
"		1:400	8·5		10·0	10·2	1·0	9·2
"		1:600	9·2			10·6	0·6	10·0
"	Mod. reagent No. 1	1:300				9·4	0·6	8·8
"	Mod. reagent No. 2	1:300				11·2†		
Gelsemine	Sol. faintly acid	1:200		5·8	9·6	10·0		
"	Sol. acid	1:200	3·8		9·8	10·4		
"	Sol. more acid	1:200	3·8		10·2	10·8		
"	Sol. faintly acid	1:400		8·0	9·6	11·2 to 12·0†		

Name of alkaloid. 0.100 used in each experiment.	Especial conditions.	Proportion of alkaloid in solution titrated.	Mayer's solution, 1–20 Normal.					
			Required to give apparent excess.	Added, giving large excess.	Produces only slight precipit.	Required for complete precipitation.	Excess at end of titration.	Actually consumed.
Hydrastine		1 : 100				7·2		
"		1 : 200				7·4		
"		1 : 300				7·8		
"		1 : 400				8 2		
"		1 : 600				8·4		
Hyoscyamine (Merck's cryst.)		1 : 200				9·2		
"	Mod. reagent No. 1	1 : 200		6·8	8 3	8.5 to 9·1†		6·7
Morphine	Sol. neutral	1 : 200			6·6	7·8		
"	Sol. acid	1 : 200			7·0	8·6		
"	Sol. neutral	1 : 400			6·9	9·1†		
"	Mod. reagent No. 1	1 : 200				8 8	0·6	8·2
Pilocarpine		1 : 200	4·8			18·8		
"		1 : 200				19·4	2·3	17·1
"	Titrated without filtration	1 : 200			16·4 ††	21·4†	1·4	20·0
"	Mod. reagent No. 1	1 : 200	9·		14·0	15 2	1·6	13·6
"	" " "	1 : 200			13·6	14·3††	1·4	12·9
Quebracho alkaloids		1 : 200				8·2 to 8·6		
"	Sol. slightly acid	1 : 400				9·6		
"	Sol. more acid.	1 : 400				10·4	1·0	9·4
"	Sol. slightly acid	1 : 600				11·2		
Quinine		1 : 200	8·8		14 0	15·5	2·7	12·8
		1 : 400		12·8		16·8		
	Sol. neutral	1 : 400	11·6		15·1	16·0	3·4	12 6
	" acid	1 : 400	12·0		16·0	18· to 19·†		
	Mod. reag't. No. 1 neutral	1 : 400		10·5		12·5		
	Mod. reag't. No. 1 acid	1 : 400	12·6			13 0††		
	Mod. reag't. No. 1 strongly acid	1 : 400	13·††			19⁇		
	Mod. re g't. No. 1, 25 per cent. alcohol.†	1 : 400	9·5			12·4††		
Strychnine	Sol. neutral	1 : 200	11·2		12·2	14·0		
	Sol. acid	1 : 200				11·0	0·6	10·4
	" more "	1 : 200	11·0		11·4	11·8	0·3	11·5
	" neutral	1 : 400	11·4 ††			12·0*		
	" acid	1 : 400				11.6†		
	" more "	1 : 400	11·4		12 0††			
	Mod. reag't. No. 1	1 : 200	10·4		11·6	12·8		
	" " "	1 : 400	11·2		11·6	13·6		
	Mod. reag't. No. 1 acid	1 : 400	11·2			12·0		

† End of reaction not well defined.

†† Modified reagent No. 1.

⁇ Precipitate forms distinct crystals.

* Precipitate forms and redissolves, more reagent again producing precipitate.

OBSERVATIONS.

Aconitine.—Titrations give pretty uniform results. The end of the reaction is generally quite sharply defined, and dilution has less influence than in the case of most alkaloids. For fluid extracts and

tinctures, estimations of alkaloid can be very satisfactorily made by the titration method. Since the character of the alkaloid is easily changed by heat and the action of chemicals, the method cannot be trusted in the examination of solid extracts and still less for commercial aconitine. In all cases the physiological test should supplement the estimation by titration of this alkaloid.

Atropine.—Results of titrations vary greatly with different samples of the alkaloid, and are much influenced by variations of conditions. The end of the reaction is never very sharply defined. After reaching a certain point it will be found that a drop of the reagent will produce a precipitate which immediately re-dissolves, while addition of several drops will produce a distinct precipitate. If collected at once and weighed, the precipitate will be found to fall much short of the theoretical weight, whereas if allowed to stand a few hours, it becomes firmly adherent to the sides and bottom of the containing vessel, but has a resinous appearance; its weight is then near what theory requires. I have not observed in this precipitate any tendency to crystallize. Most of my experiments were made with commercial atropine, containing no doubt a considerable admixture of hyoscyamine. A sample of Merck's pure atropine showed, however, the same peculiarities, somewhat exaggerated, perhaps.

From my experiments, the following practical rule may be deduced for interpreting the results of a titration of atropine, Mayer's reagent N 1-20 being used, and the end of the reaction being fixed at the point where two drops of reagent, added to the filtered solution, produce only an evanescent cloud.

Rule.—For each cc. of fluid present at the end of the titration deduct from the quantity of reagent consumed 0·05 cc., and multiply the remainder by 7·5. The product will be the quantity of alkaloid present, expressed in milligrams.

If the modified reagent No. 1 is used, its equivalent may be taken as about 8·7 mg., the dilution of the alkaloidal solution being between 1:200 and 1:400. The ordinary reagent is probably, on the whole, to be preferred. If the excess of reagent is estimated and deducted from the amount consumed in the titration, the equivalent becomes, where the ordinary reagent is used, about 9·5 to 10 mg.; with the modified reagent, No. 1, about 12. mg.

Berberine.—Mayer's reagent produces in solutions of berberine, as in those of morphine, a bulky crystalline precipitate. The titration

equivalent of the alkaloid is remarkably high. Results of titration in solutions 1:200 to 1:400 are reasonably constant, but the alkaloid is nearly always associated in the plants in which it occurs with others having a very different behavior towards Mayer's reagent. The estimation of this alkaloid is moreover easily made by a colorimetric method. It is noticeable that very little excess of reagent is required for the complete precipitation of berberine, and the alkaloid might, therefore, possibly be used to estimate excess of reagent, but for this purpose strychnine is to be preferred.

Brucine.—Results of titrations vary widely, and apparently capriciously under varying conditions.

In solutions exactly neutral, a larger quantity of alkaloid is required than in those containing a little acid, the end of the reaction being ill defined. On the other hand addition of more acid, a small proportion after all, gives a high result in the titration. The alkaloid is so easily determined by other methods that the use of Mayer's reagent cannot be recommended where this alkaloid is in question, as *e. g.*, in the examination of preparations of nux vomica and ignatia.

Cinchonine and cinchona alkaloids generally do not give satisfactory titrations, as has been long since observed. In roughly estimating the total alkaloids in a preparation of bark, the titration method may be adopted for rapidity, an arbitrary equivalent being assumed for the value of Mayer's reagent. Observation shows that this must be a very low one, viz.: not far from 5 mg., for reagent N 1-20.

Cocaine.—[This subject has been recently pretty fully discussed by the writer in the columns of the JOURNAL, and the conclusions then reached need not be here restated.]

Colchicine can be satisfactorily estimated by Mayer's reagent, provided there is present in the solution a somewhat large proportion of free acid. It requires that about 10 per cent. of the volume of the solution shall be dilute sulphuric acid (1 vol. acid in 5). Under this condition, the results of the titration are to be interpreted by the following rule: Correct the result obtained by subtracting for each cc. of fluid present at the end of the titration 0·08 cc., and multiply the remainder by 29 to obtain the quantity of colchicine in milligrams.

Emetine may be estimated by Mayer's reagent with a fair degree of precision. Correct the result by subtracting for each cc. of fluid present at the end of the titration 0·038, and multiply the remainder by 12 to obtain the quantity of emetine in milligrams.

Gelsemine gives results which vary considerably, especially with the degree of acidity of the solution. The titration method is, however, a useful one in the case of this alkaloid, because it is somewhat difficult to separate it in a pure condition, and the quantity contained in the drug is at most small. If the solution contains 1 : 200 of alkaloid, the titration equivalent may be taken as 9·5 mg.

Hydrastine.—Results vary greatly, according to the degree of dilution of the solution. It will rarely be advisable to attempt estimation of the alkaloid by titration. The following rule may, however, be formulated: Correct the result by subtracting for each cc. of fluid present at the end of the titration 0·025 cc., and multiply the remainder by 14·9, to obtain the quantity of hydrastine in milligrams.

Hyoscyamine resembles atropine in its behavior. The number of experiments made with it was not sufficient to serve as a basis for any useful deductions. It must be understood, of course, that this alkaloid is accompanied in the drugs in which it occurs by others, and that therefore there is rarely occasion to make an estimation of it by Mayer's reagent.

Morphine.—In solutions containing 1:200 to 1:400 Mayer's reagent produces a white precipitate which momentarily takes a yellowish shade, and then the whole fluid sets into a translucent jelly from crystallization of the precipitate; only tolerably strong solutions are precipitated by the reagent immediately, the limits of the reaction for practical purposes being reached in solutions containing 1:2000, although weaker solutions, up to 1:3600, may show a distinct precipitate. This is in strong contrast with the behavior of most of the alkaloids, which are precipitated copiously in solutions containing 1:30,000 to 1:80,000.

In the more dilute solutions of morphine, the precipitate assumes the form of distinct crystals. In titrating a morphine solution with Mayer's reagent, a point is soon reached where the solution gives no precipitate, either with Mayer's reagent or with a fresh morphine solution. Just before reaching this point, the solution is observed to give with the reagent, after a few seconds, a translucent gelatinous precipitate, resembling exactly precipitated alumina. The filtrate from this precipitate in a few hours yields distinct crystals. Estimation of morphine by Mayer's reagent is not to be recommended, and, of course, is wholly inapplicable to preparations of opium.

Pilocarpine.—Comment on the results of experiments tabulated

above are superfluous. The precipitate in some respects behaves much like that of atropine, but it has a strong disposition to crystallize. Notwithstanding this fact, the precipitate varies more widely in weight than in the case of any other alkaloid with which I have made experiments, and that in a most capricious manner. Moreover, solutions prepared from fluid extracts, etc., cannot be titrated satisfactorily with this reagent, the precipitate remaining obstinately suspended, and passing readily through any paper filter. The results are reported mainly as a warning to others not to attempt the impracticable.

Quebracho alkaloids resemble in their behavior those of cinchona bark. Titration with Mayer's reagent can only serve to indicate roughly the comparative value of different preparations. Of course, it does not enable us at all to discriminate the several alkaloids present, which differ widely in their therapeutic action.

Strychnine gives us as satisfactory a titration with Mayer's reagent as any alkaloid in the list. Unfortunately it is associated always in the drugs which contain it with other alkaloids, whose behavior is not so exemplary. From the completeness of its precipitation, we can make use of this alkaloid in estimating excess of Mayer's reagent in the titration of such alkaloids as require a large excess.

ASIMININE.[1]

By J. U. Lloyd.

Process for Obtaining the Alkaloid.—Extract the seeds of Asimina triloba (papaw) with alcohol; evaporate the alcohol, adding towards the last water enough to precipitate the oils; acidulate with acetic acid, stir well, and after 24 hours filter. Ammonia water is cautiously added to the filtrate until in slight excess, care being taken to avoid a strong alkaline reaction. The precipitate is collected and, while moist, agitated with sulphuric ether in successive portions; the ethereal layers are decanted, mixed, evaporated, and the residue is dissolved in a little alcohol. To this solution, hydrochloric acid in slight excess

[1] Advance proof from Drugs and Medicines of North America.

is added, when, if concentrated, a magma of crystals of the hydrochlorate of the alkaloid will be produced. If the solution is dilute, evaporation will be necessary. These crystals are purified by crystallization from hot alcohol, then dissolved in water, precipitated with ammonia and the amorphous alkaloid is dried. The yield is small, but considerable of the alkaloid is lost in the process of purification. In working large amounts, an increased yield would result after the first batch.

Properties.—This alkaloid is white, odorless, tasteless, and practically insoluble in water. It dissolves freely in ether and alcohol; less freely in chloroform and benzol. Upon evaporation of the solvents, it separates in an amorphous condition and we did not succeed in crystallizing it. The soluble salts are bitter, and produce copious precipitates with the usual alkaloidal reagents. Salts of asiminine and the usual acids employed in the commercial production of alkaloidal salts, dissolve freely in water (excepting the hydrochlorate, which is less soluble), producing bitter liquids, from which dilute alkalis precipitate the alkaloid. We did not succeed in crystallizing either the nitrate or the acetate, but the hydrochlorate crystallizes

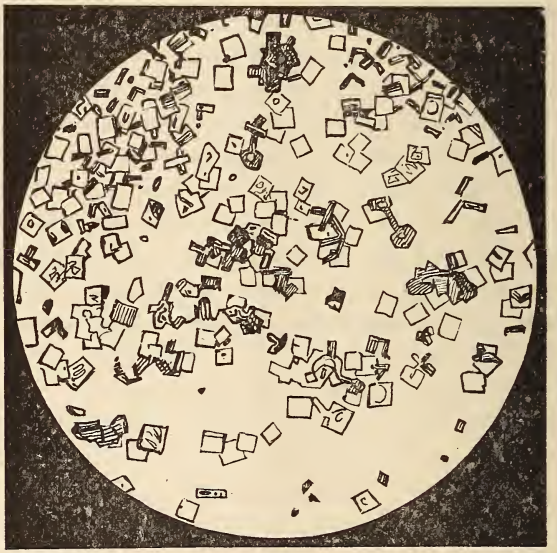


FIG. 1.—Hydrochlorate of Asiminine, magnified.

easily from alcohol, forming beautiful squares, (Fig. 1[1]) and the sulphate in lamina of crystalline nature. Figures 1 and 2 are accurate illustrations of these crystals. The principal salt owing to its easy production in a pure crystalline condition will be the hydrochlorate if this alkaloid should come into demand as a medicinal agent.

Hydrochlorate of asiminine is white, odorless, and to the taste at first sweetish and then bitter, leaving a bitter after taste. It crystallizes from alcohol in transparent square plates (Fig. 1) or in groups

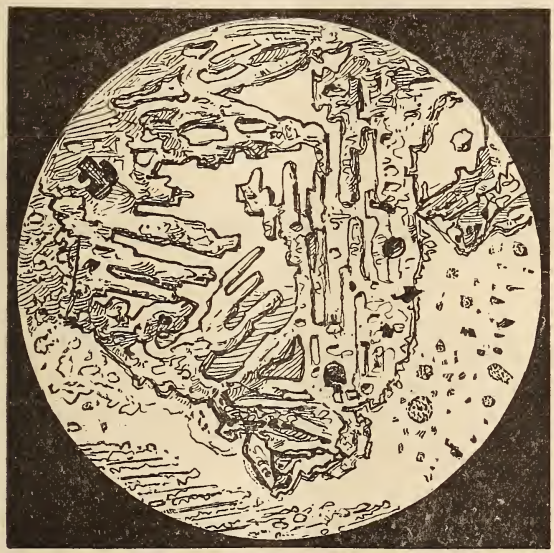


FIG. 2.—Sulphate of Asiminine, magnified.

of crystals composed mainly of the interlocked sections of cubes.[2] Even if the alkaloid be in minute amount, it forms, with nitric acid at once a carmine red which quickly changes to a deep dark purple color. This reaction is very delicate and is similar to that of concen-

[1] These crystals are from acid solution, and made by cautiously adding hydrochloric acid diluted with alcohol, to a film of the alkaloid that was deposited from an ethereal solution directly upon the slide. This gave better crystals than the evaporation of an aqueous solution.

[2] These crystals appear upon the slide to be portions of cubes in which the upper and lower faces alone are developed.

trated nitric acid on morphine salts, excepting that the color is not *blood* red, and instead of becoming lighter, darkens for a time to purple and then changes to deep red, but not yellow. The inexperienced might possibly confuse asiminine with morphine under the similar test. With sulphuric acid it effervesces, dissolves, turns greenish yellow slowly, afterwards yellowish red, then dark red, and the liquid remains this color. Hydrochloric acid does not affect it; but the addition of a little sulphuric acid and a gentle heat produces a purple color similar to the morphine reaction with same reagent. Mercuric chloride causes a precipitate in solutions of this salt. Chlorine water does not affect the alkaloid, but the solution of its muriate is precipitated white.

PREPARATION OF SUBIODIDE OF BISMUTH.

By Caswell Mayo.

Subiodide of bismuth is mentioned by Gmelin (Hand-book of Chemistry, Watts, iv. 437) as a powder which is precipitated when the iodide of bismuth (formed by the fusion of the two metals) is boiled with water. Its color is given as chestnut brown by Berthenot, as red by Arppe.

It has recently been revived as a topical application to indolent ulcers, and can be formed by triturating 306 parts of subnitrate of bismuth with 165.6 parts of iodide of potassium and sufficient dilute hydrochloric acid to form a paste. The paste becomes yellow and is then thrown into water, when the reaction is completed and the amorphous, heavy, adhesive, brick-red powder is precipitated. It is insoluble in water, alcohol, ether and chloroform, and is decomposed by the strong mineral acids with liberation of iodine, and by strong alkalies with liberation of bismuth oxide.

The formula is generally given as BiOI; I think it probable that it should be $BiOIH_2O$, though my experiments have not established this conclusively.

It has been mentioned in several journals lately, but I have not seen elsewhere any definite directions for the manipulation.

SYRUPUS SCILLÆ COMPOSITUS.

By Geo. H. Ochse, Ph. G.

This syrup is one which frequently causes the pharmacist considerable trouble. The formula of the present pharmacopœia is a good one; but the process consumes considerable time and requires careful manipulation if a clear syrup is to be obtained. The writer has been in the habit of employing the formula of Mr. C. A. Werckshagen with uniformly good results. Coxe's hive syrup prepared according to this process is always clear and effective, and as all the materials are already prepared it does not consume much time to make the syrup. The writer has never noticed any fermentation, and if the fluid extract of senega is exactly neutralized with ammonia no gelatinization can occur. The following is Mr. Werckshagen's formula:

℞ Aceti scillæ Oi.
Antimonii et potassii tartrat. gr. xxiv.
Extracti senegæ fluidi, f℥ ii.
Syrupi simplicis q.s. ad f℥ xxiv.

Evaporate the vinegar of squill to the consistency of a soft extract to remove the acetic acid; then add 18 fluidounces of simple syrup and apply heat; when clear add the tartar emetic and stir until dissolved; then take off the fire and add sufficient syrup to make the whole measure 22 fluidounces; lastly, when cold add the fluid extract of senega.

CHEMICAL NOTES.

(Brief Abstracts from Theses.)

Hydrargyrum cum Creta.—A sample of this preparation made according to the pharmacopœial formula of 1870 and over two and a half years old, was examined by Wm. S. Young, Ph. G. It lost over sulphuric acid 0.25 per cent. of moisture; water dissolved 0.75 per cent. containing a trace of mercuric salt; dilute acetic acid dissolved 63 per cent. including mercurous and a trace of mercuric oxide; dilute hydrochloric acid now removed merely a trace of mercuric oxide; the residuary metallic mercury weighed 34.5 per cent.

Two samples made according to the present formula and respectively six and two months old, were examined in the same manner, and gave

Moisture 0.16; aqueous solution 14 4; acetic acid solution 50.5; mercury 33 per ct.
" 0.12 " " 11.76 " " " 49.3 " 38 "

Hydrochloric acid dissolved nothing. In the acetic acid solution mercurous salt was found, mere traces of it in the last one, and a somewhat larger quantity in the older sample.

Nickel bromide was prepared by A. Damer Drew, Ph. G., by treating the granulated metal with bromine under water, and carefully evaporating the dark green solution, when deliquescent deep green needles are obtained, which dissolve freely in water, but are much less soluble in alcohol. The reaction of hydrobromic acid upon the metal, aided by heat, is very slow. Powdered nickel heated to redness, absorbs bromine vapor, yielding bright yellow scales of the anhydrous salt, which are deliquescent and dissolve in water with a green color. The salt has been employed medicinally as a hypnotic and sedative, and is conveniently administered in the form of

Syrup of Nickel bromide.—Put into a pint flask 12 oz. of water, add 377 grains of bromine and 137 grains of granulated nickel, digest at a gentle heat until reaction ceases, filter, and add sugar 24 oz. and sufficient water to make 32 fluidounces. The syrup has a beautiful green color, and contains 5 grains of crystallized nickel sulphate to the fluidrachm, which is an average dose.

Manganese sulphate.—Two commercial samples, one of American, the other of German manufacture, were examined by Doane Herring, Ph. G. Both were found free from zinc, iron and copper, but contained magnesium, which was precipitated by ammonium phosphate from the solution of the salt previously deprived of manganese by excess of ammonium sulphide. The amount of the impurity was not estimated.

Bismuth subnitrate.—Four commercial samples of this salt were examined by Samuel L. Rambo, Ph. G. On drying the salt at 120°C. the loss in weight from the evaporation of moisture varied between 2.0 and 3.42 per cent., and the oxide resulting from ignition, weighed 79.2, 79.8, 80.2, and 80.25 per cent. Using Fleitmann's test two samples were found to be free from arsenic, the other two containing

slight traces of that metal. By boiling with acetic acid, treating the filtrates with hydrogen sulphide, and evaporating the filtered liquids, a minute quantity of residue was left in each case. In one of the samples a trace of the sulphate was observed, and the presence of traces of carbonate and chloride was indicated in each sample. The four samples are regarded to be of medicinal purity.

Chlorinated lime is now often met with put up for retail sales either in glass bottles or in paper boxes lined on the inside with rosin. Robert C. Bicknell, Ph. G., examined one specimen put up in glass and found it to contain 35 per cent. of available chlorine; the high price of the container as compared with the cost of the contents is regarded as the only objection to this form of package. A number of paper packages were examined, the top layers of which were generally found more or less deficient in chlorine strength, while in the interior from 30 to 33 or 35 per cent. of available chlorine was found, and in a number of partly broken packages over 20 per cent. Some of the packages assaying 30 and 32 per cent. of chlorine had been kept more than a year.

Potassium bitartrate.—Ten samples of cream of tartar from different drug stores were examined by Claude H. Arnold, Ph. G., the pharmacopœial tests being used. Two did not contain any sulphate, and the remaining samples not an undue proportion of it. Chlorides were absent from seven and present to a limited extent in three samples. The same number showed the presence of iron, while seven samples gave no reaction with hydrogen sulphide in ammoniacal solution. Eight samples contained less, and two indicated more than 6 per cent. of calcium tartrate.

Seth C. Johnson, Ph. G., examined three samples purchased in drug stores and found them to be commercially pure, while of three samples purchased in grocery stores only one could be considered pure, the other two containing considerable amounts of calcium salt and starch.

Creasote.—Of fifteen samples of commercial creasote examined by Foster B. Eisenhart, Ph. G., seven were found to be pure, since they did not coagulate collodion, produced with ferric chloride a violet blue color rapidly changing to brown, and under the influence of bromine water gave a more or less deep red brown color, but not a white precipitate. The other eight samples consisted of carbolic acid.

CONTRIBUTIONS TO FORENSIC CHEMISTRY.

By Professor G. Dragendorff.

The author reports in a reprint from *Pharmac. Zeitschr. f. Russland*, the results of investigations made under his supervision with a number of drugs more or less employed. Some of these investigations have already been noticed in this Journal, namely, on aloïn, by Dr. J. Dietrich (A. J. Ph., 1885, p. 404); on convolvulin and jalapin, by Dr. J. Müller (*ibid.*, p. 556); on myoctonine, by Dr. Salmonowitz (*ibid.*, p. 459), and on the alkaloids of lobelia, by Dr. H. von Rosen (*ibid.*, 1886, p. 392). The remaining researches, which were first published as inaugural dissertations by the investigators, may be briefly summarized as follows:

Detection of Chloral.—Having previously shown that chloral hydrate may be abstracted from aqueous solutions by agitation with ether and acetic ether, Dragendorff recommends, based upon the researches of Baron Tiesenhausen, the treatment of urine first with petroleum-benzin, then with ether, when, on evaporation of the latter solvent, the chloral hydrate is left behind. Other organic mixtures, such as the contents of the stomach, require to be acidulated with diluted sulphuric acid, and macerated for a day with 3 volumes of strong alcohol; the filtrate is evaporated spontaneously until the alcohol has been volatilized, when the aqueous residue will yield fat, &c., to petroleum-benzin, and subsequently chloral hydrate to ether. Blood and organs containing much blood retain the chloral within the coagulum, in which it is best recognized by the production of chloroform on distilling with sodium hydrate. 0·005 gm. chloral hydrate may, by these processes, be readily recognized in from 75 to 100 ccm. of mixture.

The most suitable reactions for the recognition of chloral hydrate are the following:

The dry chloral hydrate is warmed with alcoholic soda solution and a little pure aniline; the odor of isonitril is still distinct, though faint, with 1–60,000 gm. of chloral hydrate.

Heat to 50°C. the hydrate with 1 or 2 drops of concentrated aqueous potassa solution, and a little naphthol; the blue color, produced also with chloroform, is recognized with 1–24,000 gm. of chloral hydrate.

Experiments with animals show that chloral hydrate is rapidly

resorbed and transformed into products which, like urochloralic acid, do not show the reactions of chloral hydrate.

Detection of Phenol.—Experiments were made by Dr. Woldemar Jacobson for the purpose of isolating and recognizing phenol. The organic mixtures, 100 ccm., were macerated for a day with 400 ccm. of alcohol, the filtrate was freed from alcohol by distillation at a low temperature and under reduced pressure, the aqueous residue filtered, agitated with little petroleum benzin for the separation of fat, and then repeatedly shaken with benzol, which solvent was evaporated in watch-glasses. The following reactions were employed:

Dragendorff's method: The residue was left in contact at ordinary temperatures with solution of mercuric nitrate, containing a little nitrous acid; the red color appears in half an hour with 1 phenol in 100,000 mixture.

Jacquemin's method: Dissolve 3 drops of colorless aniline in 50 ccm. of water. Dilute 5 or 10 drops of this solution with 5 ccm. of water, and add sufficient solution of sodium hypochlorite (1 sodium carbonate; 1 chlorinated lime; 10 water; filter), until a distinct violet or brown color is produced. Add of this freshly prepared mixture to the phenol, previously mixed with ammonia until the liquid is colored violet or brownish, when in a short time in the presence of phenol (1:50,000) the color will change to blue, or with less phenol (1:100,000) to green.

Landolt's reaction: Cloëtta and Schær have shown that the crystalline precipitate with bromine is still obtained in solutions of phenol diluted to the proportion 1:100,000. In separating small quantities of phenol from animal matter, Jacobson obtained amorphous precipitates with bromine, which, after drying, dissolving in alcohol and evaporating slowly, yielded the characteristic groups of needles. Minute quantities of phenol are best dissolved in little water, and then exposed to bromine vapors.

Detection of Thalline.—Blumenbach found that thalline is not, or only in traces, taken up, by agitating acidulated aqueous solutions with benzin, benzol, chloroform or ether, but is dissolved from ammoniacal liquids by these solvents, however only sparingly by petroleum benzin. Distinct reactions could be obtained by this treatment with 0.001 gm. of thalline in 100 ccm. of urine; from a similar amount of blood or food-mixture the reactions were faint, but with 0.005 gm. were distinct. The green color produced by ferric chloride is distinct

in solutions 1 : 10,000, and still recognizable in dilutions 1: 100,000. A green color is also produced by gold chloride, silver nitrate, chromic acid, chlorine water, and mercuric nitrate, and in acid solutions also by chlorinated lime and potassium ferrocyanide. Iodine colors dark brown, then dingy green; platinic chloride yellowish green; and a red color is produced by warm fuming nitric acid, by sulphuric and nitric acids, and by sugar and sulphuric acid. The solutions of thalline, if not too dilute, yield precipitates with the usual reagents for alkaloids.

Given to animals by the stomach or subcutaneously, thalline caused a dark coloration of the urine, which contained very little unaltered thalline, but after acidulation yielded to benzin, benzol, &c., a derivative colored green by ferric chloride; after precipitating the phosphoric acid with a few drops of ferric chloride the filtrate yields with more ferric chloride the red color observed by Jaksch.

Detection of Antipyrine.—Blumenbach recommends treating the aqueous infusions with petroleum benzin, and after the addition of ammonia with benzol, chloroform or amylic alcohol, when very distinct reactions will be obtained with 0.01 or 0.005 gm., and faint reactions with 0.001 gm., of antipyrine in 100 ccm. of organic mixtures.

The alkaloidal reagents produce precipitates in not too diluted solutions of antipyrine, and ferric chloride gives in neutral solution 1: 1000 a dark brown color, 1:10,000 a light brown and 1: 50,000 a light yellow color. Fuming nitric acid colors dry antipyrine dark red, and in liquids green, recognizable in solutions 1: 10,000. The solution mixed with concentrated sulphuric acid and warmed with a little fuming nitric acid, becomes deep red.

Observations with animals prove that antipyrine is rapidly resorbed and for the next 18 to 24 hours may be detected in the urine; but only for a few hours in the different organs. On the other hand antipyrine was found after putrefaction of two weeks in all organs of animals, that had been killed about two hours after swallowing the chemical or receiving it by hypodermic injection.

J. M. M.

Nitrite of Amyl in Opium Narcosis.—*L' Union Médicale* reports a case of opium poisoning, in which the inhalations of nitrite of amyl brought on a rapid cure, when belladonna had failed, and the patient was almost beyond help.—*Med. News*, Oct. 2, 1886.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Pulvis glycyrrhizæ compositus.—The formula of the British Pharmacopœia is identical with that used in Germany, and differs but slightly from that of the U. S. P. Dr. M. Oxley having found the powder to produce griping, proposes (*The Lancet*, Oct. 2, 1886) a modified formula in which anise is substituted for the fennel, and one-fourth part of ginger replaces an equal weight of sugar, viz.: Senna 2 p., liquorice root 2 p., anise 1 p., sulphur 1 p., ginger ¼ p., and sugar 5¾ parts.

Acorn-cacao has recently attracted some attention in the treatment of diarrhœa and vomiting in children. It is said to be made of powdered cacao seeds deprived of fat, to which are added an aqueous extract of roasted acorns, a little sugar and some roasted flour. The proportions of the ingredients are not given. A teaspoonful of the powder is mixed with cold water, heated to boiling with constant stirring, and this quantity is administered thrice daily by means of a spoon or feeding cup.

Acorn-chocolate has long been in use in Europe, and is prepared in France by incorporating 1000 parts of simple chocolate (made of cacao seeds 6000, sugar 5000, and powdered cinnamon 30 parts) with 30 parts of roasted acorns.

Hager's formula is equal parts of roasted acorns, white sugar and cacaomass, the latter being the seeds, roasted, deprived of the shells and beaten to a uniform mass in a warm mortar.

Toothache drops.—Dissolve mastic 8 parts in chloroform 14 parts and add balsam of Peru 5 parts. A few drops upon a little cotton are to be introduced into the cavity of the tooth. (Dr. Gaudet.)

Liquefy camphor and chloral hydrate, of each 5 parts, and add cocaine 1 part. A pellet of cotton soaked in this liquid and introduced into the cavity of the aching tooth is said to afford complete and lasting relief. (Dr. Gsell-Feltz.)

Mollin is highly recommended by Dr. F. A. Kirsten (*Monatsh. f. pr. Dermat.*, Aug. 1886) as a vehicle for the application of mercury and its compounds, balsam of Peru, storax, phenol, thymol, naphthol, naphthalin, chrysarobin, iodoform, salicylic acid and other substances used for inunction. Mollin is a soft soap containing 17 per cent. of uncombined fat, and is stated to be prepared by saponifying

without heat 100 parts of cocoanut oil or of fresh fat with 40 parts of solution of caustic potassa (spec. grav. 1.145, containing 15 per cent. KHO), mixing intimately with 30 parts of glycerin and heating carefully. If properly made, mollin is yellowish white and of a smooth and soft consistence, not readily altered by exposure, free from rancidity and from irritating properties, and easily removed from the skin by warm or cold water.

Antiseptic dressings are ordered by the German military authorities, according to *Phar. Rundschau, Prag,* to be prepared as follows:

Corrosive sublimate gauze.—Dissolve mercuric chloride 50 gm. in alcohol 5000 gm., and add distilled water 7500, glycerin 2500 and fuchsin 0.5 gm., the latter being added for the purpose of readily distinguishing the corrosive sublimate gauze from others. Four hundred meters of gauze are well kneaded in this solution and allowed to soak for 15 minutes; the gauze is then strongly pressed and well dried on washlines being protected from light and dust. It takes about nine hours for the complete drying of this gauze, but the time may be shortened by replacing the water partly or wholly with alcohol.

Corrosive sublimate cotton.—Absorbent cotton is soaked in the above solution and dried in loose layers.

Corrosive sublimate catgut.—A 5 per cent. aqueous solution of corrosive sublimate is prepared, in which thin catgut is soaked for about 8 hours, and the thicker kinds for 10 or 12 hours. The catgut is subsequently kept in vials with alcohol.

Corrosive sublimate silk is prepared by soaking well-washed ligature silk in a solution of 5 parts of corrosive sublimate in 100 parts of water and 20 parts of glycerin. After drying it is wrapped in oiled silk or other water-proof material; and before using, it is dipped into a 3 per cent. phenol solution, or a one per cent. solution of corrosive sublimate.

Trichlorphenol is said to have been used in Germany as a very effective remedy in epidemic erysipelas. Its composition is $C_6H_2Cl_3.OH$, and it is the chief product of the action of the chlorine upon phenol. It melts at 68°C. (154.4°F.) and boils at 244°C. (471.2°F.). On studying the action of alkali hypochlorites upon phenol, Th. Chandelon observed (*Berichte D. Chem. Ges.* 1883, p. 1749-1753) that orthochlorphenol is first produced; that on prolonging the action two dichlorphenols are formed, the *ortho-ortho* and in larger quantity the *ortho-para* compound; and that finally the action results in the

formation of *o-o-p*-trichlorphenol. This reaction was previously described by W. Dianin (*Ibid.* 1880, p. 2403); at the end of the reaction the chlorophenols exist as calcium compounds, from which they are liberated by hydrochloric acid, and may then be separated by distillation with steam. Dianin stated also that trichlorphenol checks fermentation more energetically than carbolic acid, and that for this reason a mixture of phenol and chlorinated lime is far superior for the dressing of suppurating wounds than a solution of either one of these substances. (See AMER. JOUR. PHAR., 1884, p. 51.)

For the extemporaneous preparation of trichlorphenol, Prof. Bartholow, recommends (*Coll. and Clin. Rec.*, 1886, p. 216), mixing and then filtering one part of a 4 per cent. solution of carbolic acid and five parts saturated solution of chlorinated lime. Obviously, the liquid contains the new compound in combination with calcium.

Zinc salicylate is coming into use in medicine, and is prescribed in the form of solution in water. Of two commercial samples examined by F. H. Alcock (*Phar. Jour. and Trans.*, Sept. 18, 1886, p. 226), one was fairly soluble in warm water, crystallized on cooling in long needles, and when incinerated at as low a temperature as possible, emitted an agreeable odor, assumed a pink color, and finally left 20·8 per cent. of oxide of zinc. The other sample was less freely soluble in warm water, leaving behind a white powder, the filtrate crystallizing in needles; on incineration the salt did not give off the same peculiar odor, became black, and left 25·3 per cent. of zinc oxide. For the preparation of this and other salicylates, see AM. JOUR. PHAR., 1886, p. 246.

Bismuth oxyiodide is regarded by Dr. A. Sidney Reynolds (*Med. News*, Oct. 9, 1886), as being very valuable in the treatment of chronic ulceration; he states that the salt will control inflammation, allay irritation, suppress suppuration, promote granulation and induce cicatrization. He has also employed it internally in doses of 5 to 10 grains.

When a solution of bismuth subnitrate in nitric or in hydrochloric acid is diluted with water as far as possible, and is then added gradually and with continual stirring to a solution of potassium iodide, a brown precipitate is produced, which on dilution with water turns yellowish-red, and on drying yields a bright, brick-red powder, consisting in the main of BiOI, but mixed with variable proportions of subnitrate or oxychloride. To obtain the oxyiodide pure, the brown

bismuth iodide may be dissolved in hydriodic acid or in potassium iodide and diluting the solution with water. On subliming a mixture of iodine and powdered bismuth, blackish scales of bismuth iodide having a metallic lustre are obtained. This compound is permanent in the air, and is but little affected by cold water, but hot water converts it into the red oxyiodide. (See also p. 590 of this number).

ON STERILIZING HYPODERMIC SOLUTIONS.

By R. N. Girling.

Dr. A. Poehl, of St. Petersburg, in a recent article published in the *Pharm. Zeitung*, comments on the desirability of preparing solutions of the alkaloidal salts, for hypodermic use, which shall remain free from bacteria or ferment bodies, and remarks that solutions for subcutaneous injections are generally made without any antiseptic precautions.

He says: "The very act of filtration through paper, causes the filtrate to contain more micro-organisms than the unfiltered liquid contained." This may be readily understood, when the process of manufacturing such paper is considered, and unless some method is adopted to insure sterilization, both of the water used in preparing the solutions, and of the paper used in filtering them, the risk of obtaining septic solutions is considerable. Dr. Hager, who has written on the danger of employing septic hypodermic solutions, among other precautions, recommends the use of water *twice* distilled in order to render it free from volatile organic matter.

It is, however, necessary to bear in mind the fact, that the alkaloids themselves aid in developing certain forms of bacteria, and in order to prevent this, other precautions than the employment of *doubly* distilled water are necessary.

The addition of salicylic and boracic or boric acid to the solutions has been recommended, but their use is open to objection from a medical point of view.

It has been also suggested to *boil* the solutions in order to sterilize them; but as it has been demonstrated, that such a course would cause the partial decomposition of certain alkaloids, some other means had to be sought to secure the desired end.

A process, which has given excellent results in the hands of the writer, and which is not open to the above objections, inasmuch as no foreign substance is contained in the finished solution, is as follows:

Water, which has been re-distilled from a mixture of about 2 per cent. of caustic soda and permanganate of potash, (the first portions of the distillate, if showing traces of ammonia when tested by Nessler's reagent having been rejected,) is mixed with about 1 per cent. of pure chloroform. The alkaloidal salt is to be added and the solution heated in a flask, furnished with a thermometer, to a temperature of 60° to 62° C. until all traces of chloroform have been dissipated. The resulting solution is to be filtered through paper which has been folded ready for use, and afterwards been sterilized by heating to a temperature of 125° to 130° C. in an air-chamber or drying-oven, for at least one hour. Sufficient of the redistilled water is to be poured through the filter to make the filtrate, either weigh or measure accurately, the desired quantity. Last, but by no means least, the solution is to be preserved in vials which have been washed with some of the same water and dried at a temperature of 125° to 130° C. or over. The cork used, should also be washed in the redistilled water, and dried in the same manner as the vials.

Solutions thus prepared have been kept for months without showing signs of change.—*New Orleans Med. & Surg. Jour.*, Oct. 1886.

ON THE NUMBER OF BACTERIA IN ICE.

By Dr. Carl Frænkel.

This research was instituted to inquire into the representation of a Berlin company for the artificial production of ice, that natural ice was dangerous and hurtful. Dr. Bischoff had already made chemical examinations of ice obtained from the works incriminated, and had also made some bacteriological examinations of the ice, which, however, were probably faulty in some way, as for instance, keeping the ice too long after melting. Bacteria multiply rapidly in stationary water. It is not necessary to detail here Dr. Koch's method of examination of water, nor the precautions necessary in all bacterial investigation, but one or two points require notice. Water must be examined at once after collection, on account of the rapid growth of bacteria in standing water. Moreover, the water examined must be shaken up before being transferred to nutrient gelatin, on account of the tendency of bacteria to sink to the bottom. A number of separate examinations must be made of any water, since the number of bacteria is liable to vary greatly day by day; with ice special precautions are necessary. By means of a carefully purified hammer, a

piece of ice, about double the size of one's fist, was detached from the surrounding mass, washed with distilled sterilized water, and put into a sterilized glass vessel. As soon as several grams of ice-water had collected, a measured quantity was mixed with meat-solution-pepton-gelatin, and poured on glass plates. The author again insists on the necessity of examining the water directly after the ice melts.

A small quantity of ice having thawed, as equable a mixture of the constituents as possible was made by shaking, and 1 ccm. of this water introduced into nutrient gelatin by means of sterilized pipettes.

As a rule one ccm. water was introduced into two tubes, and $\frac{1}{2}$ ccm. into other two. These last served in some measure to control the results, and ought to contain half as many germs as the first two. The contents of the test tubes were then poured on glass plates in the usual manner. The time required for the germs contained in ice to attain complete development varied with the temperature of the place where the plates were kept. It usually ranged between three and four days. The colonies were counted in the usual way. As with water, a large number of examinations were made of the same ice. The first ice examined was that of the North German Ice-works in Berlin, the material being described as "Natural" or "Raw" ice. This ice was taken in winter from the Rummelsburger See, a lake-like extension of the Spree above Berlin. It was usually collected when the ice reached a thickness of 15 to 20 cm. and was laid in large keeping compartments. The results of the bacteriological examination of specimens of this ice is exhibited in a long table, of which the commencement is here given.

Day on which Plate Cultivations were made.	Day of Counting.	Interval in hours.	Number of Colonies. Counted in 1 ccm.	Number of Colonies. Counted in ½ ccm.
15th February, 1886	19th February, 1886	90	220	116
			218	102
16th " 1886	20th " 1886	90	318	228
			472	224
18th " 1886	22nd " 1886	90	314	140
			260	120
22nd " 1886	26th " 1886	92	6,300	2,700
			5,580	3,300
28th " 1886	3rd March, 1886	74	158	70
			164	90
1st March, 1886	5th " 1886	94	920	440
			800	400
2nd " 1886	6th " 1886	95	80	50
			86	44

The most striking feature of the table is the great difference in the individual results. This will probably depend on the spot where the ice was formed, whether near or far from the surface, and whether near or far from the bank. It is further evident that the quantities of bacterial germs are sufficient to justify the question whether such material ought to be employed for certain purposes. Water containing so many germs, at times amounting to thousands, would be condemned for purposes of common use. Moreover, there is reason to believe that the water corresponding to such ice is very much worse than the ice represents it to be. The author finds on counting the germs in a water and freezing the water, that the corresponding ice contains only about one-fifth the number of developable germs. It is evident, therefore, that an ice rich in bacteria corresponds to an unusable water.

Figures are then given showing the results of experiments made with ice from other works, but as these were known to be from more impure sources than the ice already described, they were not so exhaustively treated. The North German Ice-works also produce ice from distilled and from spring water—far more of the latter than of the former. Examination of the spring water ice showed that it also contained too many bacteria. The company whose representations led to this inquiry manufacture about one-tenth of their supply from spring water; the remainder from distilled water, distilled over nto the freezing vessel. The ice from spring water was found to be as impure as the other natural ice supplies. The following table shows the results of examination of the ice made from distilled water, and may be usefully compared with the table already given.

Day on which Plate Cultivations were made.	Day of Counting.	Interval in hours.	Number of Colonies. Counted in 1 ccm.	Counted in ½ ccm
14th April	18th April	90	10 6	0 6
15th "	19th "	90	0 2	3 0
18th "	21st "	70	14 3	3 3
19th "	22nd "	70	8 8	2 5
20th "	23rd "	70	6 4	4 5
21st "	24th "	70	0 6	4 4
24th "	27th "	70	0 2	0 0
28th "	1st May	70	0 0	3 0
30th "	3rd "	70	0 0	0 0
1st May	4th "	70	12 10	4 9
2nd "	5th "	70	6 5	5 2
3rd "	6th "	70	2 7	3 5
4th "	7th "	70	3 3	2 0

The author concludes that "*the common 'raw' ice, till lately, almost exclusively used, on account of the large number of bacteria capable of development which it contains, should not be taken with food—in drinks—or for medicinal purposes. It should never be used in the treatment of wounds. In these connections artificial ice made from distilled water should be employed. The use of raw ice in contact with food, which is afterwards to be cooked, is permissible, but artificial ice is to be preferred. Raw ice may be freely used where it does not come into direct contact with food.*"—*Med. Chronicle*, Oct. 1886. *Zeitschr. f. Hygiene I. Heft* 2.

TESTS FOR ALBUMIN IN URINE.

The following reagents were investigated by a committee of the British Medical Association :—1. Dr. Oliver's papers; 2. Dr. Pavy's pellets; 3. Dr. Johnson's picric acid; 4. Sir W. Robert's acid brine; 5. A solution of picric acid saturated with common salt—picric acid brine; 6. Solution of potassio-mercuric iodide with citric acid; 7. Nitric acid; *a*, with previous boiling of the urine; *b*, applied according to Heller's method; 8. Acetic acid and heat; the urine being boiled previous to acidification. The committee experimented with some artificial admixtures of albuminous bodies in fluids other than the urine, which need not here be particularized. The general conclusion obtained from these preliminary experiments was that solution of potassio-mercuric iodide with citric acid, particularly when used after Heller's method, gives the most delicate and clearly marked re-actions; and that nitric acid is, for use in the consulting room, not inferior to any but the potassio-mercuric-iodide test; its use in the two ways indicated above being taken into comparative consideration with the other tests correspondingly applied. By the use of different reagents, the committee were able to distinguish some forms of albuminous bodies from some other states or forms; for instance, peptones from egg-albumin, or serum-albumin, or the albumin of albuminuria.

As regards the clinical use of the tests above enumerated, the committee arrived at the following conclusions :

1. Of Dr. Oliver's test papers, the potassio-mercuric iodide give the most delicate reactions of all the papers, and excel nitric acid, however applied. The ferro-cyanide papers come next, but with a decided interval, and the tungstate papers third; whilst the picric-acid

papers are less satisfactory, as an inconvenient quantity has to be used. The two first named papers require the use of citric acid in the cold, which involves a possible fallacy, in that citric acid produces a precipitate when an excess of soluble urate is present in the urine. Urine of high specific gravity should consequently be diluted, to avoid this source of error; and sufficient acid must be added to render neutral or alkaline urine distinctly acid. The potassio-mercuric-iodide papers appear to precipitate all albumins indiscriminately; but the precipitates with artificial peptones are dissolved on heating, and reappear on cooling. The ferrocyanide papers do not precipitate artificial peptones; while their reaction with other albumins is keen. One apparent fallacy that might occur in the use of Dr. Oliver's papers is not noticed in the report. It happened to us once, in employing an iodide paper to test some serum drawn from a hydrocele, to find that the paper gave apparently no reaction, whereas the liquid when boiled in another tube, became quite solid. Upon taking the paper from the first portion of the liquid, however, on examining it more carefully, it was found to be coated completely with a thick layer of solid albumin, which had apparently prevented any further egress of the salt from the paper into the liquid around, in that way frustrating all further reaction. The very sensitiveness of the test induced a belief in its failure. When, however, the serum was well diluted with water, the albuminous nature of the liquid was at once completely demonstrated by the paper. It is, perhaps, possible that the same thing might occur in a specimen of extremely albuminous urine.

2. Dr. Pavy's pellets of nitric acid and ferrocyanide of potassium are reported to give as good results as the potassio-mercuric papers of Dr. Oliver, (neither of these reagents being quite so searching as the solution of the potassio-mercuric iodide). They are stated not to precipitate peptones; and, therefore, in conjunction with the iodide solution, they may distinguish the two kinds of proteid, and, so far, help in the clinical analysis of pathological conditions. In using this test, citric acid has to be first added; and this source of fallacy (as noted above) must be avoided by dilution, where the specific gravity of the urine is high. Bubbles of gas, which the pellets sometimes liberate, must also be distinguished from a precipitate.

3. Dr. Johnson's picric acid solution requires decided excess of the re-agent, or the addition of acetic or citric acid. It is reported to be most useful, giving reactions only second to those of the potassio-

mercuric iodide solution. The mixture of picric acid and urine should be boiled. Artificial peptones are thrown down by this test in the cold, but disappear upon boiling, and reappear as a cloud on cooling. The picric acid solution should be dropped into the tube of urine, held vertically, in such a way that each drop falls upon the centre of the surface of the urine, so as to obtain differentiation by the production of a film around it, if albumin be present. This cannot be managed if the solution be poured down the side of the tube, as the picric acid solution is of low specific gravity, and highly diffusible. This gives a precipitate, not necessarily albumin, in the urine of persons taking quinine. The precipitate is distinguished by its being soluble on boiling, to reappear in a crystalline form on cooling; whilst it gives the quinine reaction with chlorine water. This test also precipitates uric acid in the cold; but this cloud disappears under heat.

4. Robert's brine-test is stated to be sensitive, and very trustworthy, though not quite so delicate as the other tests. It does not precipitate peptones or quinine; and it is said to allow the discrimination of mucus from albumin, the cloud of the former being super-imposed upon the albuminous cloud.

5. Picric acid brine can be used after Heller's method, which is not possible with picric acid solution alone; owing to its specific gravity, it gives good results.

6. The solution of potassio-mercuric-iodide, with addition of acetic acid, is the most delicate test in the list.

7. Nitric acid, used by Heller's method, and added cautiously, in a somewhat diluted state, to urine just boiled, is declared to be a test of great delicacy, and to be liable to fewer fallacies than the other tests considered. The drawback to this test is its difficulty of portability.

8. Acetic acid, added so as to ensure a decided acid reaction to urine just before, or immediately after boiling, is a delicate test.

The report states of mucin, that it is precipitated by most of the re-agents which precipitate albumin. The distinction of the two clouds, when formed by Robert's brine test, has been already noticed; the same kind of indication is given with nitric acid, in Heller's method. With regard to the other tests, mucin cloudiness thereby obtained shows less ready sedimentation than albumin cloudiness, and exhibits a marked mobile satiny appearance of the precipitate when shaken in a good light.

In some urines, the potassio-mercuric iodide and picric acid tests

produce a precipitate apparently albuminous, when nitric acid affords no such indication.

Some tests are especially portable, and capable of application without the use of cumbrous apparatus; and each test has an usefulness of its own. The committee consider that any one devoting himself to the thorough use of one of the tests, will find it sufficiently precise for all practical needs, and that, by comparative use of several tests, the discrimination of differing forms of proteids may be obtained. The picric acid test, which admirably detects albumin and peptones, if boiled with caustic potash, detects, also, the presence of sugar. The committee lastly note that the knowledge of the reactions of albumins is at present imperfect, and, possibly, capable of improvement. But to the settlement of this question their functions did not extend.—*Brit. Med. Jour.*, June 26, 1886.

ON SOME NEW HYPNOTICS.

By Dr. S. G. Webber.

Several drugs have been lately given to the profession with the claim that they are valuable hypnotics. I have had an opportunity of testing these in the cases of many patients in the Adams' Nervine Asylum.

Paraldehyde has been some years in use. It has advantages over chloral. The immediate subsequent effects are less unpleasant. It very rarely causes headache on the next day; sometimes patients have a sensation of fulness or pressure in the head for a few hours after waking. I gave it in one case where the patient had been taking chloral in large doses, not measuring the dose, and had been injuriously affected by the drug. The paraldehyde gave, in this instance, better and more prolonged rest; the patient partially recovered his mental powers and some measure of strength. The paraldehyde was continued several weeks in nightly doses of forty minims. In this patient there was probably disseminated sclerosis, and it did not seem possible to do without some agent to produce sleep, at least so long as he was at home.

The chief objection to paraldehyde is its disagreeable odor and taste, and also the odor it imparts to the breath. I do not remember to have met any unpleasant symptoms arising from its use; but had never seen a case in which it has been used habitually for a long time.

The dose is from from forty-eight to eighty or ninety minims; sixty minims is the average dose. Occasionally a dose of eighty minims has failed to give the sleep which I have desired to obtain.

Urethane came into notice later than paraldehyde; it is much more pleasant to administer, having scarcely any taste or odor.

When I first gave it the dose was too small, but by increasing it to thirty grains good results were generally obtained. Sometimes much larger doses are necessary. It is quite soluble; fifteen grains will dissolve in a drachm of water.

The after effects are generally unimportant. It has seemed once or twice to give rise to nausea the day after; but often the patient says the sleep has been very natural and refreshing. It is not so sure to produce sleep as paraldehyde.

Hydrobromate of hyoscine has the advantage of being almost tasteless; and the dose is small. I began with a dose of one hundred and twentieth of a grain, as recommended by the articles I had read; but soon found this too small, and increased to a sixtieth of a grain, using the following formula, giving twenty minims:

℞ Hydrobromate of hyoscine.....gr. j.
Alcohol.....ʒ iss.
Water sufficient for.....ʒ xx. M.

In a few instances I have given twenty-five minims of this mixture.

There is so little taste to this that it can be given in some simple drink, as gruel or beef tea, without the knowledge of the patient.

In one patient it produced discomfort in the head the next day, so that after two trials it was given up and urethane given instead. In other cases the sixtieth of a grain given for a week or more has produced no bad effects. In a few cases it has failed to produce sleep, and the sleep secured in other cases has not been of so long duration as that usually produced by paraldehyde, but subsequently in these same cases the latter drug has not proved more efficacious. On the whole, my experience with this drug is that it will act favorably with a large number of patients, that it is acceptable on account of its lack of taste and odor, and because of its small dose; the sleep obtained is very refreshing and natural; it is, however, rather more likely to leave unpleasant effects, and seems to lose its power by repetition sooner than either urethane or paraldehyde.

Hypnone has a strong odor of bitter almonds. I have given it in capsules in doses of five to eight drops (.07 to .13) or even more;

the former dose is rather small for good results. It will produce very natural sleep, and the patient awakes refreshed. It is of much less value than the drugs already considered, and fails more frequently than the others in producing sleep. It may be conveniently substituted for the others when they have been taken some time consecutively.—*Boston Med. and Surg. Jour.*, Oct. 14, 1886.

GLEANINGS FROM FOREIGN JOURNALS.

By Geo. H. Ochse, Ph. G.

The following practical suggestions and observations are contributed by Dr. E. Mylius:

Hebra's Ointment is best prepared by digesting the component parts at a temperature below 100° C. from 24 to 36 hours and stirring for several hours until all traces of water have been evaporated. When thus prepared Hebra's ointment is almost white, very mild and smooth, not rancid and of greater stability than many of the officinal ointments. One drop of oil of cloves added to 50 gm. of ointment preserves it for a considerable period.

Cerate of subacetate of lead remains white and non-irritating, nor does it acquire a rancid odor when incorporated with 2 to 3 per cent. of boric acid.

Ointment of iodide of potassium should be prepared by adding the solution of iodide of potassium to the lard and after the lapse of one hour sufficient hyposulphite of sodium to decolorize it, and ·05 per cent. of oil of cloves. Thus prepared ointment of potassium iodide will keep at least 8 weeks and does not decolorize iodine when mixed with it.

Styrax, even when mixed with oil, frequently deposits resin when rubbed on the skin. As styrax owes its efficacy to the cinnamic acid ethers and not to storesin, the resin may be removed by treating with petroleum ether.

Ferrated cod liver oil, as usually prepared, has a bitter acrid taste. By saponifying cod liver oil and decomposing with ferric chloride, then dissolving the precipitate in cod liver oil, a ferrated oil devoid of any unpleasant taste is obtained.

Resorcin ointments frequently turn blue when applied to the skin owing to the presence of free ammonia or carbonate of ammonium.

Commercial bicarbonate of sodium contains hyposulphite of sodium as an impurity. One sample examined by Dr. Mylius contained several milligrams of arsenic in 200 grams of $NaHCO_3$.—*Pharmaceutische Centralhalle*, xxvii, p. 515.

Alkaloid in old flour.—Old flour when treated with ether and the ethereal solution evaporated on a water-bath, yields a fatty, acid substance having the disagreeable, penetrating odor of old flour and a burning taste when placed on the tongue. A small quantity mixed with water and heated on a water-bath shows the reactions quite distinctly when treated with the ordinary reagents for alkaloids (potassio-mercuric iodide, ferric chloride, etc.).—*Rundschau*, (*Prag*), xii. p. 730.

Chartreuse liquor.—To prepare this liquor none but spirit free from fusel oil should be used. Angelica seed 125 grams, angelica root, 30 grams, arnica flowers 15 grams, coriander 250 grams, hyssop 125 grams, melissa 500 grams, wormwood 125 grams, cardamom 15 grams, Ceylon cinnamon 15 grams, mace 20 grams, and cloves 15 grams, are digested for 24 hours in 36 liters of 95 per cent. alcohol and 20 liters of water and then distilled. To the distillate are added 25 kilograms of sugar previously boiled with water, 2 liters of finest cognac, 25 grams of citric acid previously dissolved in water and sufficient water to make 100 liters. Chartreuse is colored golden yellow with tincture of saffron and should be two years old before using.—*Rundschau*, xii.

Allyl tribromide.—Tribromide of allyl is a new substance obtained by Wurtz by treating one part of allyl iodide with two and a half parts of bromine. Allyl tribromide is a colorless liquid, soluble in ether of the density 2·436 and has the boiling point 217° C. Armand de Fleury has used it in hysteria, asthma, croup, etc., with success. Dose: for hypodermic injection 2 to 4 drops in 1 or 2 cc. of ether, or 5 drops in a capsule twice or four times daily.—*Rundschau, Prag.* xii, p. 731.

Roach poison.—Soxhlet recommends a mixture of 1 kilogram of angelica root and 20 grams of oil of eucalyptus as a sure vermin destroyer. The powder is strewn around the infested places in the evening, and in the morning the dead vermin can be swept up.—*Ibid.*, xii, p. 740.

Vinum condurango.—Friedrich, Hoffmann, Wilhelmy and others praise condurango in affections of the stomach; in cancer of the

stomach it considerably alleviates the suffering. The wine of condurango is prepared as follows: 100 grams of true Ecuador condurango and 50 grams of gentian root are macerated in a liter of Madeira wine for 5 days, expressed, and sufficient Madeira wine is added to make 1 liter, filter.

Vinum condurango ferratum is made by dissolving 20 grams of citrate of iron in one liter of wine of condurango.

Vinum condurango cum pepsino consists of equal parts of condurango wine and wine of pepsin.—*Ibid.*, xii, 751.

Lantanin the active principle of Lantana brasiliana (verbenaceæ) has been successfully employed by Dr. Negrete as a febrifuge in doses of 1 or 2 grams per diem in pill form.—*Rundschau,* xii, p. 755.

To remove rust-stains from nickel-plated ware, the article is thoroughly greased, and after several days rubbed off with a cloth moistened with ammonia. If any spots are still visible they are touched with dilute hydrochloric acid and immediately rubbed off. The ware is then washed and polished with polishing powder.—*Ibid.*, xii, p. 761.

An ethereal solution of tannin, of syrupy consistence, is said to be the best application to burns. It immediately soothes the intense pain, dries rapidly and forms a pliable, non-elastic coating which is preferable to collodion, because it does not shrink and become stiff.—*Ibid.*, xii, p. 773.

Corn-plaster.—The following is recommended by *Südd. Apoth. Zeitung:* Empl. adhæsiv. 100; cupri subacetat. 8; acid. carbolic. 2.

Cement for porcelain and glass: Isinglass 30; water 30; glacial acetic acid 60; mastic 3.—*Rundschau,* xii, p. 776.

Traces of alcohol in volatile oils can readily be detected by mixing a portion of the oil with some powdered chromate of potassium, adding either sulphuric or hydrochloric acid and warming, when, if any traces of alcohol are present, the liquid turns green.—*Ibid.*, xii, p. 775.

Corrrosive sublimate soap.—To determine the quantity of corrosive sublimate in soap, Kaspar proceeds as follows: Ten grams of shavings from several cakes of soap are digested in a flask with 10 grams of dilute hydrochloric acid and 100 grams of water, and boiled for ten minutes, when the mixture is allowed to cool and the liquid is decanted. This operation is repeated twice, using the same quantities

of acid and water each time. The mixed fluids are filtered and evaporated to about 100 grams, the requisite amount of sulphydrate of ammonium is then added, and the resulting sulphide of mercury dried at 100° C. until it ceases to lose weight. 232 parts of HgS correspond to 271 $HgCl_2$. To be successful with the operation, the flask should be connected with a condensing tube and the mixture well shaken during ebullition. The yellow, oily liquid floating on the solution of chlorides can be solidified by treating with cold water, thus hastening the operation somewhat. To prevent errors, it is well to examine the acid solution for other metals which yield precipitates with ammonium sulphide. The solution should yield precipitates with the ordinary reagents for mercury (ammonia, iodide of potassium, stannous chloride and caustic potash), and should not separate out calomel or metallic mercury.—*Schweizerische Wochenschrift,* xxiv, p. 287.

Cuprous chloride.—Cavazzi prepares cuprous chloride by dissolving four grams of cupric sulphate and two grams of hypophosphite of sodium in 50 cc. of water, adding thirty drops of fuming hydrochloric acid and heating to 60° or 70° C., when cuprous chloride is precipitated. The precipitate is first washed with acidulated water (eight drops HCl to 100 cc.), then with absolute alcohol, and is dried in vacuo over sulphuric acid. By this process the hypophosphorous acid is oxidized to phosphoric acid.—*Pharmac. Zeitsch. f. Russland,* xxv, p. 567.

Expulsion of Tape-worm by the mouth, a very rare occurrence, has been observed by Dr. Martel, surgeon to l'Hotel Dieu de Saint-Malo. —*Archives de Pharmacie,* Sept. 1886, p. 430.

Gelosin is a mucilaginous substance extracted from Gelidium corneum, *Lamouroux,* an alga of Japan, and is found in commerce as dry, whitish fragments, extremely flexible. Gelosin forms an excellent vehicle for the administration of soluble medicaments or for making suppositories, cataplasms, bougies, etc. M. Guérin has presented to the Société de thérapeutique, of Paris, some specimens of gelosin medicated with camphor, creasote, sulphate of zinc, turpeth mineral, cocaine, extract of belladonna, iodoform, corrosive sublimate, carbolic acid, coal tar, etc. To manipulate this substance all that is required is to add an equal weight of warm water to dissolve it, and then to incorporate with it the medicament. Conveniently sterilized gelosin might be advantageously employed in bacteriological researches.—*Jour. de Phar. et de Chimie,* xiv., 318.

Treatment of uncontrollable vomiting of pregnant women. Dujardin-Beaumetz gives the following: ℞. Cocainæ hydrochloratis, 0.50, aquæ destillatæ, 300. Dose, two tablespoonfuls every hour. The patient should lie down to prevent vertigo.—*Jour. de Phar et. de Chimie,* xiv. p. 352.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Venezuela Sandalwood Tree.—Wm. Kirby gives a minute description of the anatomy of the leaf and leaflets of this tree (*Phar. Jour. and Trans.*, June 15, 1886), which does not differ to any great extent from that of most bifacial leaves. The leaf has two rows of palisade cells, and 7 or 8 rows of rather close parenchyma cells; the lower epidermis is papillose. The chief characteristic is, however, the numerous oil receptacles distributed over the lamina, and located usually below the uppermost row of palisade cells, but also found at the lower surface, especially near the mid rib, and small ones occasionally in the mid rib itself near its dorsal surface; these oil cavities are without epithelium. From the microscopical structure of the leaves and of the stem (see June number, p. 296), the author concludes that the tree belongs to the Rutaceæ.

Chelidonium majus, Linné.—Ernst Schmidt has shown (*Archiv d. Phar.*, June, 1886, p. 531), that Zwenger's chelidoninic acid is identical with succinic acid, as was stated by Walz in 1860; also (*ibid.*, p. 513) that chelidonic acid is identical with Weppen's veratric acid.

Bowdichia major, Martius.—Peckolt isolated from the bark of this Brazilian tree (see Am. Jour. Phar., 1876, p. 510) the crystallizable glucoside *sicopirin* which was not examined physiologically. A. Petit claims to have isolated from the bark an alkaloid, which in guinea pigs caused convulsions and had narcotic and mydriatic properties.

The nearly allied *alcornoco bark,* from B. virgiloides, *Kunth,* contains a neutral crystalline principle, which was observed by Biltz, Frenzel, (1843) and Spirgatis (1871), and which seems to be of a waxy nature. An alkaloid was also not found by Geiger.

Guilandina Bonduc, Linné.—From the cotyledons of the yellow seeds of this tree, Heckel and Schlagdenhauffen (Comptes rend. ciii, p. 89) have isolated the bitter principle in the form of a white powder

which is nearly insoluble in water and petroleum benzin, sparingly soluble in ether and carbon bisulphide, and freely soluble in alcohol, acetone, chloroform and glacial acetic acid. Sulphuric acid colors it brown and afterward purplish red; hydrochloric acid produces a rose color, and nitric acid forms with it a red resin. It has been found efficient by Dr. Isnard in intermittent fever, in doses of 0·1 to 0·2 gm.

A similar principle has been obtained by Flückiger from the gray seeds of Guilandina Bonducella, *Linné* (see *Pharmacographia*, p. 212).

Sumbul root.—Angelic acid does not pre-exist in this root; for according to Ernst Schmidt (*Archiv d. Phar.*, June 1886, p. 528) it is not extracted by boiling the root with a weak solution of sodium carbonate, acetic acid, probably mixed with some fatty acids, being found in the distillate. But on treating the balsam obtained with hot petroleum benzin, with an alcoholic solution of potassa, angelic acid is formed, together with the isomeric methylcrotonic acid, probably by the decomposition of one of the constituents of the root.

Cucumis myriocarpus, Oliver, is known in southern Africa as *cacur*. The medicinal portion of the plant is the fruit, which is yellow, subglobose, about the size of a large gooseberry, somewhat soft-prickly, weighs from 60 to 100 grains, and contains numerous seeds. The pulp has a faint cucumber-like odor and a decidedly bitter taste, is soft and viscid, and becomes more fluid on being warmed. The Kaffirs use the green fruit as an emetic, heating it first and then squirting the pulp of two fruits into the mouth, when emesis occurs in about fifteen minutes. The rind of the fruit and the testa of the seed are slightly bitter; the embryo is tasteless. Dr. G. Armstrong Atkinson (*Edinb. Med. Jour.*, July, 1886) found the pulp to act as a cholagogue purgative when given in non-emetic doses. Its emetic action appears to be local, and to be followed by purgation in case a sufficient amount of the pulp had been retained.

Cyclamen europæum, Lin.—The tubers contain a peculiar left-rotating sugar, *cyclamose*, $C_{12}H_{22}O_{11}$ which was obtained by Michan (*Chem. News*) from the concentrated tincture by precipitating with absolute alcohol, dissolving the precipitate in water with the aid of lime, again precipitating by alcohol, and decomposing the lime compound with carbonic acid gas; the watery solution of the sugar is then evaporated over sulphuric acid.

Conessine and wrightine.—On page 301 of AMER. JOUR. PHAR., 1882, the use of this alkaloid has been noticed, as prepared from the East Indian conessi bark, which is obtained from Wrightia (Holarrhena, *DeC.*) antidysenterica, *R. Brown.*

Some years ago German missionaries had brought from tropical Africa a bark, that had been found very useful in the treatment of dysentery. Wiggers regarded this bark as identical with East Indian conessi bark, and N. Wulfsberg (Dissertation, Göttingen, 1880) showed that it was derived from Holarrhena africana, *DeCand.* A. Faust and A. Abich isolated from this bark an alkaloid, which in a somewhat impure condition, was examined physiologically under Prof. Marmé's supervision by A. Keidel (Dissert., Göttingen, 1878). This alkaloid has been recently prepared in a pure state from the African bark by Prof. Polstorff and P. Schirmer (*Ber. D. Chem. Ges.*, 1886, p. 78) who obtained from 15 and 23 kilos respectively 14 and 30 gm. of pure conessine. Its preparation is tedious owing to the presence of persistently adhering impurities. The outlines of the process are as follows: The infusion made with acidulated water, is concentrated; by the careful addition of ammonia considerable quantities of coloring matter, calcium and aluminium compounds are precipitated; excess of ammonia separates the alkaloid in whitish floccules; its acetic solution is decolorized by animal charcoal, precipitated by ammonia, and the alkaloid repeatedly recrystallized from hot alcohol, some hot water being added to the solution.

Conessine has the composition $C_{12}H_{20}N$, crystallizes in radiating groups of delicate silky needles, and after drying forms a light white powder, melting at 121·5°C. It is very sparingly soluble in water, dissolves freely in alcohol, ether, chloroform and benzol, volatilizes merely in traces with the vapors of water, and has a very bitter taste. The salts are best prepared by treating the ethereal solution of the alkaloid with acid. The *hydrochlorate*, $C_{12}H_{20}N.HCl.H_2O$, crystallizes in needles and like the *nitrate*, is permanent on exposure, while the *sulphate* is deliquescent. The *picrate* crystallizes from diluted alcohol in yellow needles. The double salts with the chlorides of platinum, gold and mercury, the iodides of meythl- and ethyl-conessine, and the methylconessine-hydroxide were likewise prepared and examined.

H. Warnecke (*Berichte*, 1886, p. 60) prepared the alkaloid *wrightine* from the seeds of Wrightia antidysenterica. On prolonged heating to

between 60° and 70°C., it turns yellow, melts at 122°C., sublimes partly undecomposed on being carefully heated in a retort, and in addition to the solvents mentioned before, dissolves freely in petroleum-benzin, amyl alcohol and carbon disulphide. Ultimate analysis led to the formula $C_{11}H_{18}N$. On mixing a trace of the alkaloid with water and adding in a thin stream concentrated sulphuric acid, a golden yellow color appears at the bottom of the dish, and after twelve hours the whole liquid is green. The colorless solution of the alkaloid in strong sulphuric acid gradually becomes yellowish green and finally light violet. The same solution heated by steam changes in five minutes to dark green, and on the addition of a few drops of water becomes blue-green. The same solution mixed with a trace of nitric acid changes to golden yellow and orange yellow.

Prof. Polstorff (*Berichte*, 1886, p. 1682) has likewise prepared the alkaloid from the seeds of Wrightia antidysenterica and finds it to agree with conessine in melting point and other characters, as well as in the behavior to acids and reagents; the analytical figures agree likewise well with the first formula.

The East Indian conessi bark is known in Mauritius as "remède Mauvis" (*Bull. Soc. méd. Maurice*) and is usually prepared by mixing twenty spoonfuls of the powdered bark with a spoonful of a mixture of the roasted bark with arrowroot. This is divided into doses of 25 gm. each, of which one is taken daily, infused in half a liter of water.

Anacharis canadensis, Planchon, s. A. Alsinastrum, *Babington*, is declared by Mr. Brandes to have caused the disappearance of malaria and diarrhœa in a marshy district where these diseases formerly appeared yearly in a sporadic or epidemic form (*Med. News*, Aug. 28, 1886). Whether the recommendation to plant this waterweed in marshy localities, with the view of checking malaria, is likely to be followed by the desired success, may probably be more readily ascertained in malarial districts of North America. The plant being quite common in ditches, ponds and slow streams, it should be ascertained whether it is absent from such districts.

Kauri resin is considered by Dr. B. W. Richardson (*Asclepiad*, July, 1886), to be useful as a deodorizer and disinfectant, either combined with iodine or by burning it, when it gives out a very pleasant odor. Water mixed with the powdered resin and used as a spray in a room is said to render the air ozonic.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 16, 1886.

The second of the present series of Pharmaceutical meetings was held this day. Mr. William B. Thompson was called to the chair. The minutes of the last meeting were read and there being no corrections required they stand approved.

The Actuary presented on behalf of our fellow-member, Mr. Robert C. Davis, the following works: "Simple Medicines," by R. Pemel, published in 1652; "London Dispensatory," translated by H. Pemberton, dated 1760; "The New Dispensatory," dated 1796, and the "Eclectic Dispensatory," dated 1828. He also presented a copy of Buffon's "Natural History," in 3 volumes, Herndon's "Exploration of the Valley of the Amazon," with accompanying maps, and Grove's "Greek and English Dictionary." On motion, the books were accepted and thanks of the meeting were returned to the givers.

Mr. F. X. Moerk, Ph.G., read a paper upon *solution of nitrate of mercury.* In the discussion which followed the reading of this paper, Prof. Maisch stated that the solution of the new Pharmacopœia was evidently intended to be as nearly as possible identical in composition with that of 1870, and that in preparing the manuscript, 50 was inadvertently written in place of 60 per cent.; normal mercuric nitrate was not soluble in water without decomposition, to avoid which an excess of nitric acid was necessary. The paper was referred to the Committee on Publication.

Prof. Maisch exhibited a botanical specimen of a tropical plant, the *Dioscorea bulbifera*, and several tubers, received from Professor Lloyd, which grew in the axils of the leaves and resemble small potatoes in appearance. The tubers are farinaceous and are used for food.

He also showed a specimen of the root of the Scuppernong grape vine, or southern fox grape, the *Vitis vulpina.* The root which had been sent by Mr. P. W. Vaughan, of North Carolina, had been taken from a plant about three years old and resembled a tress of long, dark-colored, coarse hair. The northern fox grape, which grows wild in our woods, the *Vitis cordifolia*, has a thicker and stronger root.

Professor Maisch also exhibited the fruit of the *Luffa ægyptiaca*, known as the wash rag plant, towel gourd or vegetable sponge, from the fact that after the removal of the pulpy matter of the fruit there remained a network of fibrovascular tissue, resulting from the lateral and inward growth of the three placentas, and which was used in the East as a flesh brush and after moistening it, as a sponge. The fruit was grown in this city from seeds furnished by Mr. Moerk.

Mr. Thompson stated that in the formulary of the Pennsylvania Pharmaceutical Association *talc* was recommended as a *filtering material*, and he inquired of Mr. Robbins whether he had used it and what his experience led him to think of it; the result of his experiments was favorable to it if the washing of it had been thoroughly attended to, but not otherwise.

After a short time spent in conversation on various matters, the meeting adjourned.

THOS. S. WIEGAND, *Registrar.*

PHARMACEUTICAL ASSOCIATIONS.

The Michigan Pharmaceutical Association held its fourth annual meeting at Grand Rapids, October 12–14. Besides the usual addresses and reports, a number of valuable papers were read at this meeting, one of which is published in our present number. The Association now numbers nearly 800 members. The next meeting will be held at Petoskey, July 12th 1887. Frank J. Wurzburg, of Grand Rapids, was elected president, and S. E. Parkhill, of Owosso, secretary, for the ensuing year.

The South Dakota Pharmaceutical Association was organized at Mitchell, October 20th, and is intended to embrace the druggists and pharmacists south of the 46th parallel. D. S. White, of Flandreau, was elected president; W. S. Branch, of Parker, secretary, and L. T. Downing, of Sioux Falls, treasurer. The first annual meeting will be held in Sioux Falls on Tuesday following the first Monday in September, 1887.

EDITORIAL DEPARTMENT.

Education and Examination.—In former volumes of this journal the educational requirements of different European countries, for enabling one to legally practice pharmacy, have been repeatedly explained. These requirements may be briefly summarized to be for the different countries of continental Europe as follows: Before entering upon his apprenticeship the young man must have pursued his studies in the various general branches, in some of the classical languages and in the elements of natural sciences in certain institutions, and must have reached a certain grade which is fixed by law. After having served for several years as an apprentice under the instruction of a pharmacist, and passed an examination as assistant, he is required to spend about two years or more at a university or school of pharmacy, and is then admitted to an examination before a Commission or Board, which examination must be passed creditably before the candidate is permitted to take charge of a pharmacy or carry on the business on his own account.

In Great Britain the legal requirements are entirely different. There is no *educational* proof necessary, either before becoming an apprentice, or before becoming a proprietor. The ordeals to be passed are *examinations*, as a matter of course, in addition to practical experience in the store, before the final examination is undertaken. That these series of examinations cannot fulfill the objects of education, has been observed in Great Britain years ago; but the difficulty now encountered is to secure the passage of proper amendments to the present laws.

The pharmacy laws, which have been passed in the United States during the past seventeen years, are even less efficient than those of Great Britain,

inasmuch as the passing of a single examination before a Board will enable a person, having the requisite store experience, to be regarded as a legally qualified pharmacist.

In educational as well as in other matters the various nations rarely utilize the experiences gained by other nations in the same channel; and for the present at least it is left in Great Britain as well as in the United States, to the individual pharmacist to supply, of his own accord, the deficiencies of legal requirements concerning educational attainments. That this is really done to a considerable degree is shown by the number of well-educated pharmacists in both countries; and while it must be acknowledged, that this number of well informed pharmacists should be greater than it really is, it must also be acknowledged, that this is the fault of the laws and of the methods inaugurated by such laws which sanction a mere examination to take the place of a thorough education. We do not undervalue the difficulties that are in the way of ultimately securing a change in the direction indicated; on the contrary we believe that these difficulties will become greater in proportion as the value of pharmaceutical education, aside from the practical training, is disregarded and supplanted by examinations.

We have been prompted to these remarks at the present time on reading a letter from Professor Attfield, written in relation to the Intercolonial Pharmaceutical Conference, which was called to meet in Melbourne on the 27th of October, one of the objects being "to bring about uniformity in the educational qualifications required of pharmaceutical chemists in the Australasian colonies." Prof. Attfield's letter is published in the *Australasian Journal of Pharmacy* for September, and as far as it relates to the above question, is as follows:

I do trust, for the welfare of Australasian pharmacy and pharmacists, that due prominence will be given at the Conference to the relation which the course of study and the examinations should bear to each other. If examination alone be depended on as a test of the knowledge possessed by a candidate, that knowledge will—according to the irresistible operation of the law of demand and supply—become (after the first year or so of the examinations) superficial and ephemeral knowledge. Mere examination *cannot* distinguish between this temporary stuff and that real lasting knowledge which is serviceable alike to the candidate himself, his calling and the community. Every good examiner knows this to be true, and every authority on education has long known it to be true. In Great Britain we have only found all this out by bitter experience, and though we are all agreed as to the remedy, the difficulty of counteracting the evil *now* is enormous. The remedy is to require every candidate, before he enters the examination-room, to show by a proper schedule that he has regularly and profitably attended a publicly-conducted, properly supervised, sound course of study. The examiners, knowing that the course of study is trustworthy, that the teachers are trustworthy, and that the candidate has only got his schedule signed after showing at weekly *tutorial* classes that he has really learned what he was set to learn, will have the comparatively easy task of ascertaining by a few questions that teacher and candidate have done their duties. I do implore the Conference to *begin* by demanding this relationship between education and examination; the evils and difficulties *we* now find so stupenduous will thus, in the colonies, never arise.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Die Wichtigsten Heilmittel in ihrer Wechselnden Chemischen Zusammensetzung und Pharmakodynamischen Wirkung übersichtlich dargestellt. Von Dr. P. C. Plugge, Professor an der Reichsuniversität in Groningen. Uebersetzt von Edward Schær, Professor der Pharmacie am Eidg. Polytechnicum in Zürich. Jena: Gustav Fischer, 1886. 8vo.

The most important remedies, considered in their variable chemical composition and pharmaco-dynamic action. By Prof. Dr. P. C. Plugge. Translated from the Dutch by Prof. E. Schær.

This valuable and important work consists of two parts, of which the first, upon 115 pages, discusses the causes of the differences observed in the chemical composition of certain crude drugs, chemicals and galenicals. Aconite, belladonna, calabar seeds, cinchona, colchicum and digitalis may be mentioned as examples of the crude drugs under consideration; the various narcotic extracts, resin of podophyllum, etc., represent the pharmaceutical preparations; and among the chemicals we find aconitine, atropine, caffeine, white precipitate, calomel, chloroform, digitalin, iodoform, spirit of nitrous ether, ether, veratrine and others.

In the case of crude drugs, the influences exerted upon their composition —as far as known—by the time of collection, habitat and cultivation, botanical varieties of the typical species, allied species, part used, age of the part at collection, preservation and accidental admixtures, are thoroughly discussed, and the suggestions made by different observers are carefully noted. Most of these drugs yield several alkaloids or glucosides, either one of which, as a rule, does not fully represent the medical properties of the drug. These principles, as met in commerce, are in many cases not pure, but contain other constituents of the drug, or some of the derivatives generated in the process of manufacture, which are sometimes inert, or more frequently have an action entirely different from that of the original or principal constituent of the plant. Principles sold under the same name, but coming from different laboratories, have for such reasons been found to differ widely, and in some cases, dangerously. It was, therefore, of importance to ascertain the results of the various investigations made in this direction, and including the effects of air, moisture and chemical agents; and it is not surprising, that in the light of these investigations, the use of such principles as aconitine and digitalin must be regarded as fraught with danger, and that prominent authorities are even inclined to discard the use of digitalis and some other drugs in favor of proximate principles obtainable of reliably definite composition.

Materially different effects must be expected from chemicals having a different composition, but recognized by the various pharmacopœias under substantially alike names, as, for instance, the fusible and infusible white precipitate; or from such chemicals which, like calomel, are obtained in greatly differing degrees of division by modifications in the process of man-

ufacture, always provided that such differences in the effects be not due to accidental impurities.

The composition and activity of narcotic and other extracts obviously depend primarily upon the activity of the part of the plant and the quality of the material from which they are prepared; but likewise upon the complete extraction of the active principles; upon the amount of other inert constituents dissolved by the menstruum used; and upon the amount of moisture remaining in the finished preparation. In these respects there is very little uniformity in the processes of the different pharmacopœias.

This want of uniformity in the composition of many medicinal preparations is comprehensively illustrated in the second part of the work, where, upon 72 pages, a large number of preparations, mostly galenical, as directed by eleven national pharmacopœias, have been arranged in compendious tabular form, indicating the process of manufacture, menstruum, proportional strength and ingredients.

It will be observed from the foregoing that the causes for the variation in the activity of medicines are very numerous, and that a great many investigations will be necessary to overcome the difficulties encountered. It was a most meritorious undertaking on the part of the author, to collect together the results of previous researches in this direction in such a shape, that they become at once suggestive of the line in which further inquiries are to be made; and the labors of the translator will be duly appreciated by those who are better conversant with German than with the Dutch idiom, in which the work was originally published.

The great desirability, if not absolute necessity of rendering the heroic preparations of the different pharmacopœias as nearly as possible uniform in medicinal activity, is again illustrated by the work before us. Such an aim is, assuredly, not unattainable, although the progress made in the past with such an end in view, has been slower than might have been expected, considering the importance of this object for both medicine and pharmacy.

We may state yet that in the careful perusal of the work we have noticed only one antiquated statement which has been overlooked by author and translator, namely, the asserted presence of berberine in podophyllum; the absence of this alkaloid from the rhizome has been shown by several investigators some years ago.

Manual of Practical Pharmaceutical Assaying, including details of the simplest and best methods of determining the strength of crude drugs and galenical preparations. Designed especially for the use of the student and of the practical pharmacist. By A. B. Lyons, A.M., M.D. Detroit: D. O. Haynes & Co., 1886. 12mo, pp. 151.

This work, which has just been received, is of such a nature that we deem it of importance to consider it at once, inasmuch as it has a bearing in the same direction as the work by Prof. Plugge and Schaer, noticed above. But, while in the latter the extent and the causes of the variation of activity of

drugs are considered, Dr. Lyons' work aims at the valuation of potent drugs and their galenical preparations. In this respect it follows in the wake of Dragendorff's "Werthbestimmung" (see Am. Jour. Phar., 1875, p. 92), and its author acknowledges himself indebted for many of the processes offered by him, to the labors of Prof. Dragendorff, as well as to those of Dr. Squibb, and of others who have worked in this direction on special subjects.

The work is, with few exceptions, confined to vegetable drugs, and it is but natural that the large majority of these should be such which owe their medicinal properties to one or more alkaloids, inasmuch as the recognition and accurate estimation of these compounds have been more thoroughly studied, than the determination of other groups of organic bodies. In addition to such drugs we find considered digitalis, elaterium, podophyllum and rhubarb, the solvents alcohol and glycerin, the ethers amyl nitrite and ethyl nitrite, and the proteids pepsin and peptone.

The introductory part treats of the apparatus, reagents, methods of assay and proximate analysis, and special methods for separating alkaloids. This is followed by the chemical valuation of the different drugs, and an appendix is added giving in tabular form the results of assays of aconite, belladonna, cinchona and other important articles.

Extensive study and practice of the processes discussed are noticed upon every page; and the author is thereby enabled to offer a great many valuable suggestions and modifications, which will be of great advantage to those who may have to perform such analyses without having the time to give to the lengthy comparative investigations, that the author has been enabled to carry on. The directions are precise, so that they can be readily followed by those devoting the necessary care to such manipulations, though they are naturally in nearly all cases so delicate, that only those having considerable experience in analytical work can hope to reach trustworthy results. The attentive student will find the practical hints and explanations of great service in his studies.

In heartily recommending the work for its intrinsic worth and usefulness, its neat external and internal appearance deserves to be noticed, as well as the small number of typographical errors observed by us; through oversight the name of the author of a process for crystallized digitalin, on pages 89 and 90, is repeatedly spelled Nativalle.

First Annual Report of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania. Harrisburg: E. K. Meyers, State Printer, 1886. 8vo, pp. 361.

The State Board of Health was created by an act of Legislature approved June 3, 1885, and organized July 2, following. The annual report must be transmitted to the Governor during the first week in December; the report before us, therefore, covers a period of five months only. Much of the time was necessarily occupied with the initial measures for carrying out the

objects of the law; but considerable work was accomplished in the brief space of time covered by this first annual report.

Transactions of the American Dermatological Association at the tenth annual meeting held at Indian Harbor Hotel, Greenwich, Conn., on the 25th, 26th and 27th of August, 1886. Boston: G. H. Tilden, M.D., Secretary. 8vo, pp. 71.

The Proceedings of the following State Pharmaceutical Associations have been received:

Alabama. Pp. 24. See July number, p. 358.

Illinois. Pp. 199. See July number, p. 358.

New Hampshire. Pp. 57. The thirteenth annual meeting was held in Manchester, September 14th, and another meeting will be held in the same place on the fourth Tuesday of January, 1887. The present secretary is Chas. B. Spofford, Claremont.

New Jersey. Pp. 105. See July number, p. 361.

Ohio. Pp. 161. See July number, p. 365. Assistant Secretary is C. T. Inman, Akron.

Virginia. Pp. 102. See June number, p. 319.

Wisconsin. Pp. 60. See October number, p. 527. The pamphlet contains also the fifth annual report of the Wisconsin Board of Pharmacy, covering 36 pages.

Resorcin and Cocaine in Whooping Cough.—Dr. Moncorvo has used resorcin immediately after the application of a ten per cent. solution of muriate of cocaine to the larynx and pharynx, and found that the combined use of these drugs furnished better results in the treatment of whooping cough, than could be obtained from their application singly.—*Central bl. f. Med. Wiss.*

Iodide of Sodium.—A leading article in the *British Medical Journal* thus sums up the advantages of iodide of sodium over iodide of potassium: "(1) It can be used therapeutically for almost all, certainly the chief, purposes for which potassium iodide is used, and with similar beneficial results. (2) Sodium iodide is more assimilable than the iodide of potassium, both locally to the digestive organs and to the general system. (3) Many of the local and general undesirable effects which are produced by potassium iodide do not follow the use of sodium iodide."—*N. Y. Med. Monthly.*

OBITUARY.

Joseph G. Richardson, Ph. G., M. D., died suddenly of apoplexy in West Philadelphia, November 13th, at the age of 50 years, 10 months. He was born and educated in Philadelphia and learned the drug business with Charles Ellis & Co., graduating from the Philadelphia College of Pharmacy in 1857, his thesis being on the alkaloid of Veratrum viride, which he believed to be identical with veratrine (see Am. Jour. Phar. 1857, p. 204). For several years afterwards he conducted a drug store and while thus engaged published a formula for compound syrup of phosphates (Ibid., 1858, p. 19). After graduating in medicine from the University of Pennsylvania, he practised this profession for several years at Union Springs, N. Y., when he returned to Philadelphia, where he soon became prominent through his devotion to medical microscopy, his hygienic studies, and his voluminous writings on these subjects. During the past year while visiting Europe, he spent much labor in investigating the water supplies and sanitary arrangements of European cities.

Dr. Richardson occupied the chair of Hygiene in the University of Pennsylvania and was a member of the local Board of Health and of various medical and hygienic societies in this country and in Europe.

Samuel F. Troth, died in Philadelphia, November 18th, in the eighty-sixth year of his age. When the Philadelphia College of Pharmacy was organized in 1821, he was not of the requisite age to join it in membership; but he attended the first course of lectures delivered in that institution during the winter 1821-22, and then passed the examination, which rendered him eligible for membership in the College, the degree of Graduate in Pharmacy not being conferred at that time and for several years afterwards, until 1826.

Mr. Troth was a member of the College for over sixty-four years, and served the institution faithfully as chairman of the committee on Sinking Fund and as vice-president. During the past eighteen years he had retired from active work in the College; but his interest in its affairs and its progress remained unabated to the last. The important services which he rendered the College will doubtless be more fully reported by the proper committee.

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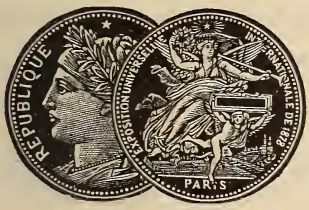
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Professor of Theory and Practice of Pharmacy.

SAMUEL P. SADTLER, PH.D.
Professor of Chemistry.

HENRY TRIMBLE, PH.G.
Professor of Analytical Chemistry.

ASSISTANTS TO THE PROFESSORS:

JOHN E. COOK, PH.G., Materia Medica and Botany.

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The Chemical Laboratory, under the direction of PROF. SADTLER, assisted by PROF. TRIMBLE, will be open daily to receive special Students during the Regular Session, beginning in October, and during the spring and summer from March to August 1st. Students are received at any time for individual instruction.

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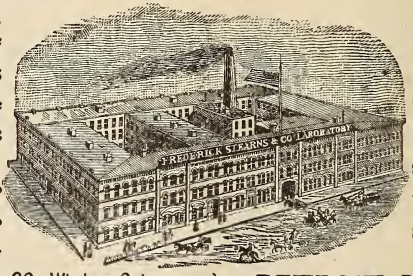
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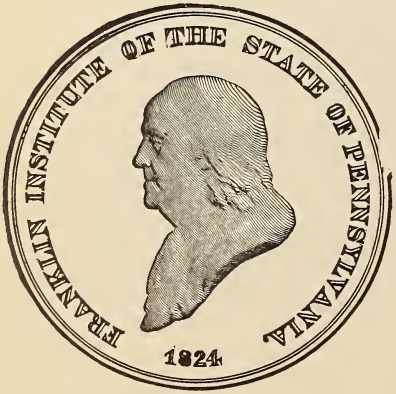
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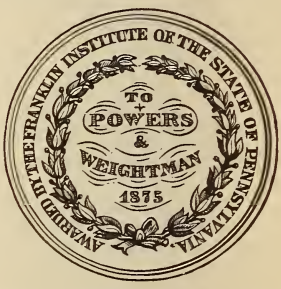
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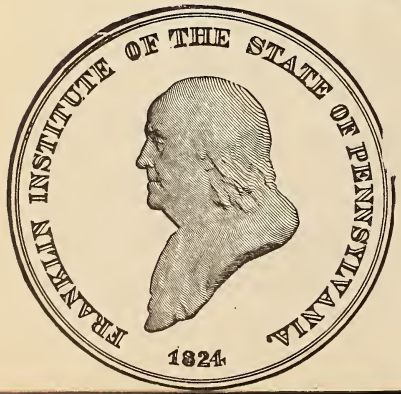
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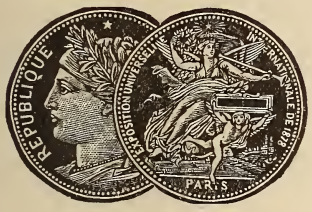
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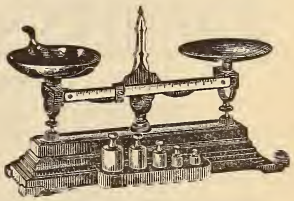
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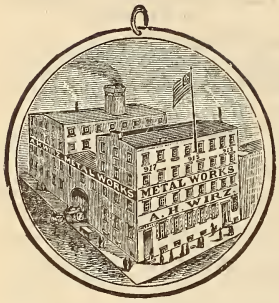
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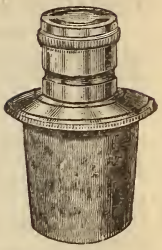
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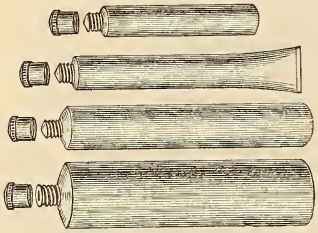


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